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A Review of the Hardware and Metal Trades.

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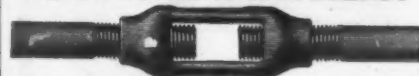
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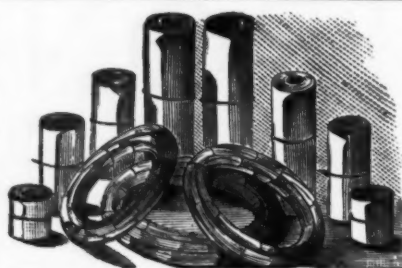
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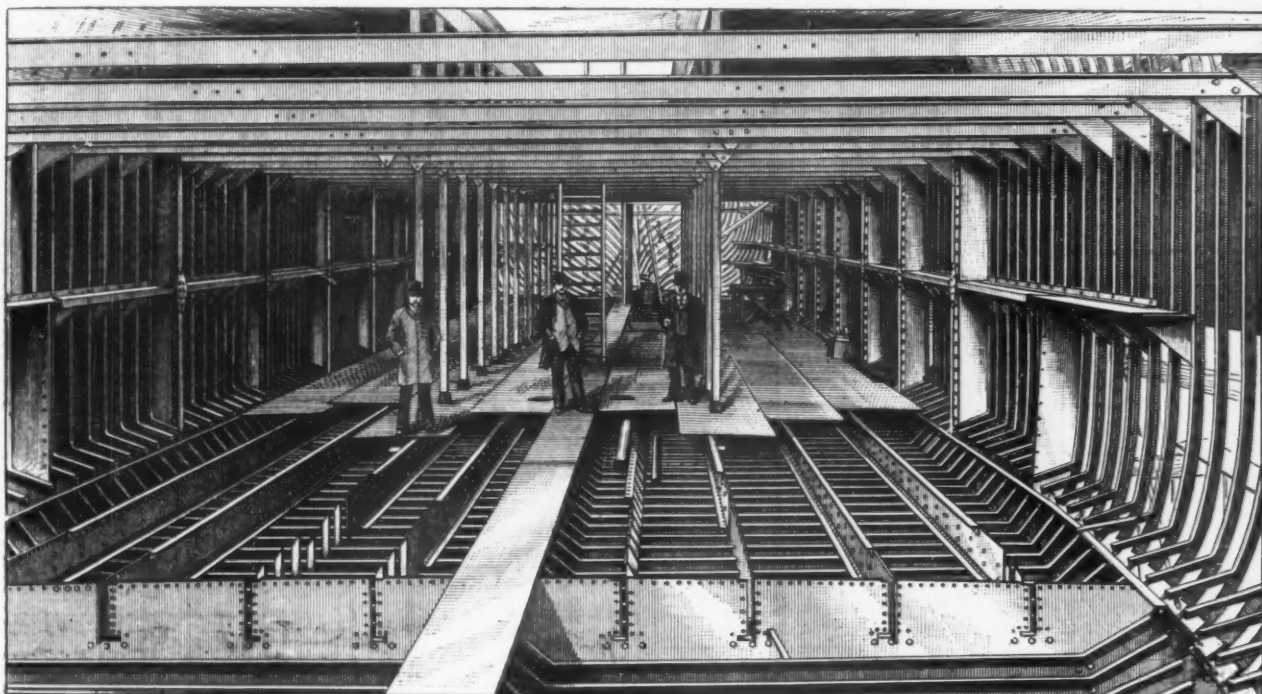
THURSDAY, JANUARY 7, 1892.

THE WHALEBACK.

The McDougall whaleback barges and steamers continue to attract wide attention, and by many are regarded as likely to create a revolution in the handling of heavy freight on the lakes, the Atlantic and the Pacific. Certainly very rapid progress has been made. Including No. 101, 18 vessels have already been built by the American Steel Barge Company of Superior, Wis. Of these the Colgate Hoyt, Joseph L. Colby, Charles W. Wetmore, E. B. Bartlett and A. D. Thompson are steamers. The company also own Nos. 101 and 202, built in 1890 by Messrs. Handren & Robbins of Brooklyn, for the American Steel Barge Company, and now

116 are 265 x 36 x 24 feet in size and can carry 2400 tons when loaded; Nos. 117 and 118 are 292 x 36 x 22 feet in size and will carry 2500 gross tons of dead weight on a draft of 14 feet 6 inches. The two barges built in Brooklyn, Nos. 201 and 202 are 190 x 32 x 20 feet in size and have a cargo capacity of 1500 gross tons. So much for past work, which aggregates a total of 46,100 gross tons carrying capacity. On the routes between Lakes Superior and Erie it is estimated that the 18 vessels just enumerated, excluding Nos. 117 and 118, are capable of making a dozen round trips each, in a season of about seven months, and in that time carrying about 1,000,000 tons, and, at an average of 75 cents a ton each way, the earning ability of the vessels would be about \$750,000.

ter results, therefore, than the Thompson or Bartlett are able to do, which latter were built for salt water service, and will be sent to it as soon as the depth of water down the rapids of the St. Lawrence will permit. These four steamers are to be 306 feet long over all by 38 feet beam by 24 feet depth of hold, and will have a dead weight capacity of 2600 tons on a draft of 14 feet 6 inches, but being built for a draft of at least 17 feet, their gross capacity loaded to it would be 3300 gross tons. The power used in these steamers will be developed by triple expansion engines of about 1200 indicated horse power. The surplus buoyancy of these steamers, loaded to 17 feet, would be 1600 gross tons, giving, actually, far more freeboard than is necessary. The tow barges to be built will be of the same



A McDOUGALL WHALEBACK UNDER CONSTRUCTION.

in use upon our coast, one of them being the consort of the Joseph L. Colby. The Colgate Hoyt was built especially for the lake trade, and has a record of 14 miles an hour. The others were built for Atlantic and Pacific Ocean service, and were therefore built to go through the Welland Canal, their size being accommodated to the length of that waterway.

The Vessels Completed.

No. 101 is 200 x 25 x 18 feet in size and has a freight capacity of 1200 gross tons; Nos. 102 and 103 are 260 x 36 x 22 feet in size, with a cargo capacity of 2400 tons; Nos. 104 and 105 are 284 x 36 x 22 feet in size, with a capacity of 2700 gross tons, and the Colgate Hoyt, of the same dimensions of the last preceding two, has a cargo capacity of 200 tons less than they; No. 107 is identical in size and capacity to Nos. 104 and 105; the Joseph L. Colby is 265 x 36 x 24 feet in size, with a cargo capacity of 2100 gross tons; barges Nos. 109, 110 and 111 are of the same general dimensions as the Colby, with a capacity of 2300 tons of cargo more; the steamers Wetmore, Bartlett and Thompson are each 265 x 38 x 24 feet in size and are capable of carrying 2500 gross tons; barges Nos. 115 and

The cost of running the whalebacks is indicated by the following:

The Minnesota Steamship Company's steamer Matoa and the whaleback steamer Colgate Hoyt, made four round trips each, this year, for the purpose of comparison. The trips were from Ashtabula to Lake Superior and return, with ore, and the four trips were made and the cargoes discharged in 28 days by each vessel. The Hoyt carried 8660 tons of ore and the Matoa 8500 tons in that period of time. The Hoyt burned 122 tons of coal per trip, on an average, and the Matoa burned 178 tons and 300 pounds per trip in the same time. The bills for engine supplies to the Hoyt averaged \$23.40 per trip, and to the Matoa the average was \$48.78 per trip.

The Work in Hand.

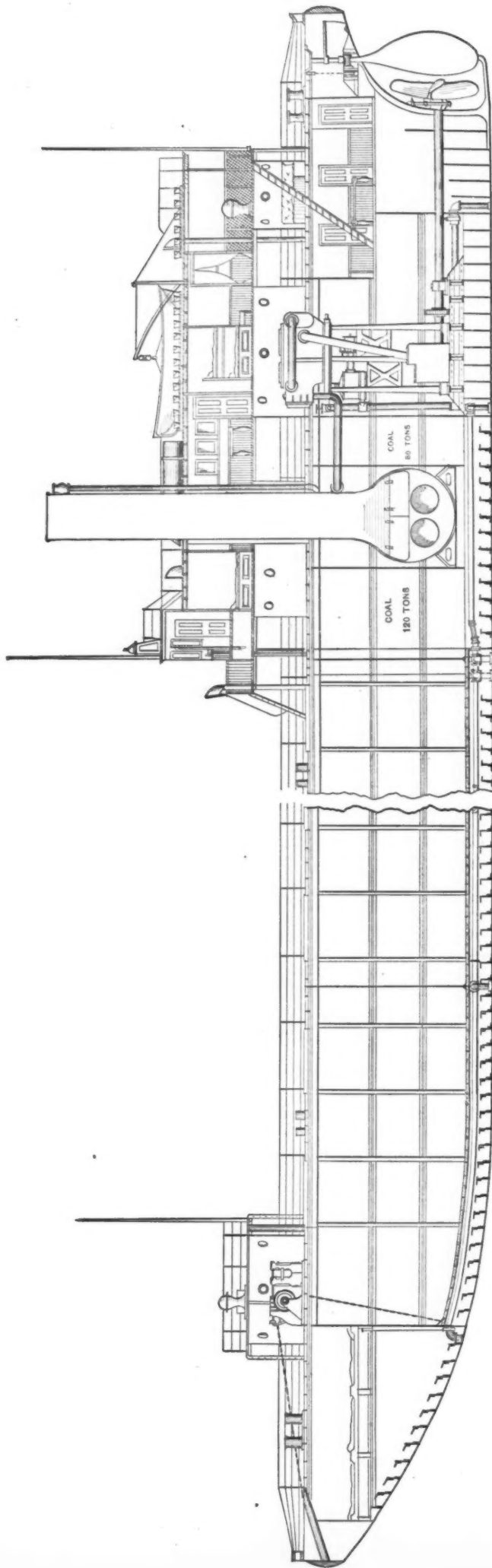
The intention of the company is to build four steamers and six barges during the coming winter, and it is stated that there has been added to this the 450 foot long passenger steamer, which had been designed and modeled, but not settled upon positively to build, besides a dry dock, to be the largest on the great lakes. The four steamers to be built are to be purely for lake service and will show bet-

general dimensions as the steamers, with a gross capacity of about 3000 tons on the same draft.

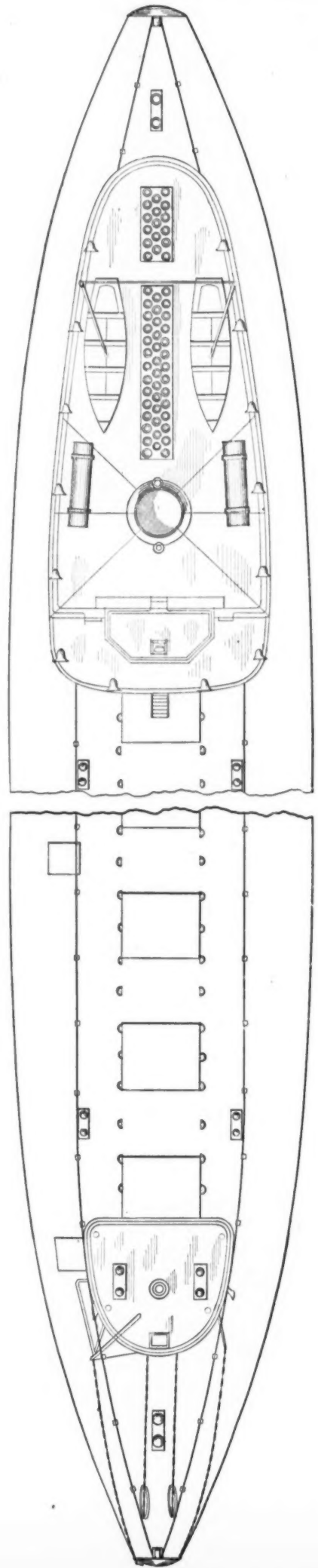
The Vessels Projected.

In addition to the work outlined above, which the American Steel Barge Company have decided to build, there is being considered the building of two steamers 315 x 42 x 24 feet in size, to carry 3400 tons on a draft of 16 feet, driven by an engine developing 1500 horse-power, and two others 345 feet long, 45 feet beam and 26 feet depth of hold, capable of carrying 3850 gross tons on a draft of 16 feet with engines of the triple expansion type developing 1800 independent horse-power, the whole four being expected to maintain 14 miles an hour loaded.

The steamer which is to be built for the World's Fair use, and to run between Chicago and Mackinac Island, making a round trip daily, is to be 450 feet in length, 44 feet beam and 26 feet depth of hold, driven by twin screws from triple expansion engines of from 4500 to 5000 horse-power, at the rate of 21 knots an hour on a draft of 15 feet. This steamer will be provided with a central line longitudinal bulkhead and eight athwartship



265 Feet by 38 Feet by 24 Feet, Over All.



PLAN AND ELEVATION OF MCDOUGALL WHALEBACK STEAMER.

bulkheads, and capable of accommodating 1000 passengers on the trip to the island, and three times that number in a day excursion from Chicago.

The most complete statement of the peculiarities of the whaleback has been printed in

J. B. Oldham's Paper

issued in the "Transactions of the American Society of Civil Engineers," from which we reproduce the sections showing the design of the vessels. One view of a whaleback under construction, printed herewith, was taken from a photograph obtained by a representative of *The Iron Age* during a recent visit to the plant of the company at Superior, Wis.

the whaleback barges tow, when we take into account their large capacity and enormous dead-weight ability. For example, the steamship Joseph L. Colby, with only 850 indicated horse-power, can tow not fewer than three of these vessels nearly 8 miles per hour. This would not be bad work if such a boat were light, but when we learn that this can be accomplished with 400,000 bushels, or nearly 9000 tons, of wheat on board the efficiency may surely be called phenomenal; for, though it is generally assumed that the thrust from a screw propeller is greater than the tow-rope pull, this is not always the case.

A few weeks since it was the author's good fortune to make a trip from Lake

to attain which varies as the cube of the velocity; but even when discounted in this way the result is still worth noting, for it represents in cost of coal 1 ton of freight carried 100 miles for less than 1 cent. Incidentally it raises the well beaten problem of the most economical speed for a freight steamer. The author considers the average speed of modern lake steamers to be too high, as they are not required to run before an Atlantic gale.

The great length of tow rope used on the lakes (frequently as long as 120 fathoms) has somewhat surprised the author, for he thought the nearer the power approached the resistance the greater the efficiency. We may assume, however, that these people with great experience know what is best, but there is probably another good reason for working with a long tow rope. Rankine says, "that propeller is the best which drives astern the largest quantity of water at the least velocity;" or again, "the useful work of the propeller is proportional to the backward acceleration of the wake." Other authorities maintain that such water is left astern. We are assuming the vessel to be moving ahead, of course, not astern, but if it be true that the pressure on the after surface of the screw blades is attained by the production of a partial vacuum on the fore side, it would seem that the water must be driven astern, perhaps not quite in the form of a regular twisted rope, as we often see illustrated, though that the screw blades do give the water in contact with them some rotary motion appears from observation and deduction quite incontrovertible. There is no denying that the bow of a floating vessel, when in motion, does impart like motion to the film of water of more or less thickness which impinges on her skin. If the hull can thus impart motion to the water in the direction of its advance by the medium of skin friction, does it not follow that the screw blades may also impart rotary motion to the film of water directly impinging on their surface as they revolve? Thus it would seem to be advisable to allow the "tow" to remain as far away from the water put into motion by the screw as possible, as well as not to interfere with the wave of replacement as it advances on to the stern of the propelling vessel.

With reference to the cost of towage the author may mention that the rule on these lakes is for the steamer to receive one-third of the freight due to the barge, but the McDougall barges are all being towed for one-fourth of their freight.

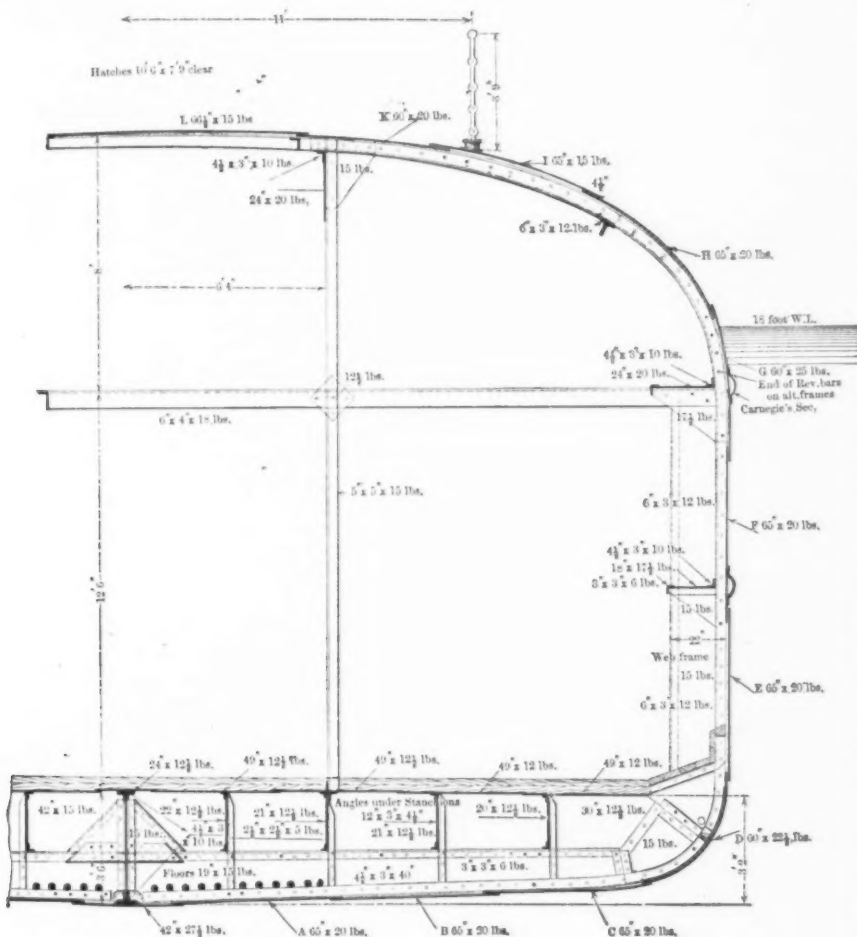
Self-Trimmers.

The author calls these vessels self-trimmers, which name was given to certain steamers on the Tyne; and for this reason wing boards were fitted from the top sides, extending up to the deck and diagonally toward the center line of the vessels. Their province was to take away the vacant corner that is always left in an ordinary vessel, just at the junction of the top with the sides and deck; but the designer does not believe in vacant spaces at all, and so instead of hiding this corner, as it were, he takes the bold step of cutting the corner off altogether, thus enabling the cargo to fill the hold as full as an egg, and that without padding of any kind. Thus these vessels may truly be called self-trimmers.

As regards collisions, if the object, when designing this bow, had been to produce the form of least destructive power, it could not have been accomplished better, for this is just the opposite of the ordinary upright stem or "ram" bow which so frequently does greater damage below than above the water line.

Stanchness.

During one of the most severe gales we have had on the waters of the lakes, two



Web Frames 24 Feet Apart.—Ballast Tank 42 Inches Deep.

MIDSHIP SECTION OF WHALEBACK.

We may quote the following from Mr. Oldham's paper:

It was said some time since that the northwestern lakes would soon be flooded with the McDougall barges, and now, it really seems as if this prophecy would very soon be consummated, for in his last trip up these lakes the writer passed no fewer than three tows of these vessels, besides the Colgate Hoyt, and the tow with which he came quickly and pleasantly down the lakes. This flooding of the lakes with whalebacks is not looked on complacently by either our shipbuilders or ship-owners. As the question is often asked, the author desires to state his opinion that, given sufficient free board, strength and power, the North Atlantic trade may be safely carried on in such vessels.

There is nothing more surprising about these whaleback steamers than their extraordinary speed, considering the low power and small consumption of fuel required, unless it is the ease with which

Superior in the handsome wooden steamer Sitka of the Wilson Line. The barges 105 and 109 were in tow, with a combined cargo of over 4700 tons dead weight on board. The Sitka carried in addition 1900 tons, including her fuel; hence, the total dead weight carried was 6600 tons, and the gross displacement of all three vessels would not be less than 10,600 tons, or about the same as the ocean mail steamers City of Rome or Servia. A careful timing of the vessel proved beyond a shadow of doubt that the Sitka steamed with its tow fully 8½ miles per hour on the average.

These vessels transported on this occasion 1 gross ton a distance of 100 miles for a consumption of 3.65 pounds of coal at 8½ miles per hour; at a 10-knot speed, the best average the writer is acquainted with, equals 1 gross ton carried 100 miles for every 5 pounds of coal burnt. Of course this great discrepancy is largely attributable to the higher speed, the power

of these whalebacks were on Lake Superior, making good weather, considering all things; for so fierce was the gale and so heavy the sea, that a new schooner, in good trim, foundered in sight of the whalebacks, while the latter are here now, having weathered the storm without damage or danger. As regards our steel lake steamers, they are quite fit to encounter with safety an Atlantic storm as they are ordinarily loaded on these lakes, but if they ever come to be loaded down, like "three-deck" tramp steamers, it will, I believe, be found that their deck-houses, companions, skylights and hatches are quite unequal to withstand the seas of the North Atlantic. No fewer than 41 British steamers were lost during the one disastrous month of December, 1872, the most serious losses occurring to low powered grain laden vessels in the North Atlantic. The Teutonic, with a bow 32 feet out of water, is none too good to face a severe storm in that ocean.

Now, a word about the construction of these peculiar vessels. The author, from a careful examination, would say that he has never seen better work. He would particularly notice the ballast tanks, which are most carefully planned and constructed throughout and among the best he has seen in America. This is saying a good deal, for the most important feature in a steamer next to the bottom itself is the double bottom arrangement.

As regards their stanchness he would relate some facts which appear very creditable. Four of them each loaded cargoes of wheat on their first voyage and delivered the whole freight, after carrying it over 1000 miles of stormy water, without the slightest damage. It is an uncommon thing to find any steel vessel perfectly water-tight on her first voyage, but here we have a fleet of four vessels which did not leak a drop from the beginning to the end of their first voyage. The designer may be justly proud of this achievement.

Rolling Qualities.

Let us examine the question of their rolling qualities. The fault with our broad lake steamers is that they have too much stability of form. This is brought about by the center of buoyancy moving out from the center too rapidly and too much as the vessel heels over. The best way of counteracting this would be to cut off the upper corners of the gunwale, or rather to curve them in just as the American steel barges are formed. This would cause them to roll much easier, or, in other words, make them better sea boats. As regards stability, it may be said that so long as the present maximum ratio of breadth to depth is maintained, there would seem to be little or no cause for anxiety about their stability even with a full cargo of grain, if fairly loaded. This is not a mere statement nor yet a deduction, for the Charles W. Wetmore has recently steamed across the Atlantic Ocean in ballast, without any cargo in the hold, and with over 600 tons weight of coals on her 'tween deck beams, which are situated 16 feet above the keel.

In conclusion, the following may be cited as among the desirable improvements in lake steamship construction, as being within the range of practical achievement during the next few years in this center of the world's progress in mechanical science.

Improvement in Construction.

1. Greater length and breadth are necessities in steamers.
2. Greater simplicity in design and construction are desirable.
3. Deeper water ballast tanks and bottoms to be more carefully arranged to withstand vertical longitudinal stress.
4. Top sides and upper works to be designed more particularly to resist increased

stresses due to greater length in proportion to depth.

5. Hold bulkheads to be made stronger generally and stiffened as may be required to resist the hydrostatic pressure. The bulkhead to be more efficiently connected to the shell of the vessel than generally obtains; also an improved system of bulkheading is advisable, with a view to avert sudden disaster after violent collision.

6. A more efficient system of bilge and ballast pump, suction pipes and valves is desirable.

7. Uniformity in handling or turning steering wheels is a necessity if collisions are not to increase.

Stockless anchors to stow in the hauser pipes would save labor. Shorter stroke in engines and fewer tubes in boilers would give increased efficiency.

Improved rules for the construction of steel vessels and a proper system of inspection are necessities if marine insurance is to continue a possibility with the insured and the insurer, for the shipowner pays for the losses in the long run, the underwriter's business being a commission on the amount of loss paid, and the greater the amount of loss in the long run, the greater would be his commission on the loss.

Professor Thurston's Views.

The new departure in ship construction referred to in the paper of Mr. Oldham is one of exceptional interest, but I think that it involves no new principles and develops no previously unfamiliar facts in the department of naval architecture and marine engineering. The experiment now being tried on so large and satisfactory a scale simply illustrates the general principle that in marine engineering, when prompt delivery of freight is not important, the costs of transportation are made least by adopting a low speed. That this principle has a limit is probably very true, but this limit is found at some extremely moderate speed. When it is remembered that the power demanded to impel any vessel at speeds for which its form is well adapted varies as the cube of the speed, and that the cost in steam for work so done varies between the two termini of a given route as the square of the speed, and inversely as the square of the time of transit, it becomes obvious that high speeds are enormously costly, and that low speeds are correspondingly economical. Again, the modern steamship, as commonly built, is adapted for the best service in mixed traffic. It must be equally satisfactory as a conveyor of passengers and of freight, and its freight may be either the so-called "fast freight," which can be assessed heavily for costs of transportation, or the freights of iron, steel, grain and cotton, which may just as well be transported at low speeds and delivered a comparatively long time after shipment. Such a vessel is adapted especially to neither one nor another of these diverse and contradictory purposes; and it consequently and naturally can do neither kind of work to best advantage and with maximum economy and profit to its owner. Build the ship for a single trade, and it becomes at once possible to attain previously unexampled economy.

Thus the fast steamers in the transatlantic trade should be made passenger and express freight boats simply, and the McDougall steamer illustrates the same principle precisely, in being constructed in such manner as to be well fitted for exactly the reverse case, heavy freights at low velocities. Taking the speed of the former as 20 knots, its tonnage at its load displacement as 10,000 and its power as 2 horse-power per ton at its average speed, the same tonnage, in any hull equally well shaped for the lower speed, could be driven at 8 knots by about one-sixteenth

that power, or about $\frac{1}{8}$ horse-power per ton, or 8000 tons 8 knots an hour with 1000 horse-power. At $7\frac{1}{2}$ knots the figure for power becomes about 600 horse-power, or a little better than is here reported for the Colby when towing "nearly 8 miles an hour" ($7\frac{1}{2}$ knots), and better than the Sitka is reported to have done.

The self-trimming construction of these boats is a good illustration of the advantage which comes of the freedom gained by the naval architect, when he may design for a single and specifically characteristic work. The ordinary case is one in which decks for passengers and working decks for the men must be provided. Here, discarding sail-power, the "tumble home" of the old Constitution and her contemporaries of the early part of the century is readily carried further, and far enough to permit this self-stowage of the grain which is expected to be the common freight of these vessels. The design seems to me to be an admirable illustration of a courageous and sensible working out of a specified problem, unhampered by custom or convention. This form of section also promotes seaworthiness, as claimed by the writer of the paper, and as does anything which permits the sea to pass over and by the ship, instead of breaking against her sides or on her decks. I was once for a year on duty on our largest and heaviest "monitor" ironclad, built during our Civil War, and I never spent a more comfortable year when at sea (and I have been in all kinds of ships, month in and month out, at all seasons on our Atlantic coast and elsewhere) than on the old Dictator monitor. I have known a claret bottle to stand by the hour (empty) on the messroom table when a gale of wind was blowing overhead, the seas sweeping where they chose, but never causing noticeable rolling. In this ship there is, I presume, as there should be, some passage below decks, fore and aft, for stormy weather, and below decks I should expect it to be, as claimed, thoroughly comfortable in the heaviest weather, and should anticipate, as a common result of the same formation of hull, impunity, so far as the ship is concerned, in passing through the heaviest gales. This point is, to my mind, certainly a good one, and a most important one. I like also the double bottom and water-ballast arrangement. I have experienced its good qualities in earlier years at sea, and am confident that it will prove satisfactory, if properly constructed and handled.

The seven conclusions with which the paper concludes seem to me to be thoroughly correct, and a most excellent statement of essential principles in this class of construction, and, in the main, for naval construction generally. The advantages which the oval section and ellipsoidal form of these vessels offer in providing opportunity for strengthening the upper line of the beam—for the ship is to be considered a beam subject to all sorts of vertical, transverse and longitudinal stresses as well—are well worth considering, as is their advantage in simplicity of construction, small cost and superficies, with large capacity and minimum skin resistance.

The one thing remarkable in this case seems to me to be the fact that shipowners and a naval architect have been found having a sufficient independence and originality to work together in the solution of a simple obvious problem, unhampered by either precedent or apprehension of criticism, professional or unprofessional. I was attracted by the original designs of Captain McDougall years ago, when he was endeavoring to introduce his fast ship with its singular section, and have been glad to see that he has taken up a more promising line of commercial work, and with such prompt success. As lake freight steamers, I imagine they will be found ad-

mirably suited for their work, and I shall not be surprised if they ultimately find permanent place in the transatlantic transportation of slow, heavy freight. I would congratulate the captain and his friends on the success thus far attained.

Criticism by C. H. Haswell.

This paper is rendered interesting by the recital and some of the results furnished, and if I entertain the claims of the writer correctly, he advances several claims to superiority of this new type of vessel. Also, that this type, which is designated as "whaleback," affords "extraordinary speed," together with "large capacity and enormous dead-weight ability," and that the speed of one of them is claimed as "somewhat phenomenal." Further, that they are exceedingly staunch, tow with ease and small consumption of fuel, roll easily, and that their stem is of an outline to produce the least possible destruction in the event of a collision. Now, in order to consider or concur in these very desirable qualities, one properly looks to discover the particular elements and features whereby their attainment, so boldly asserted, is supported, and to present this subject to those who are not familiar with this peculiar construction or type of vessel, I submit: In outline its submerged portion approximates to that of a semi-elliptic spindle, while the upper portion or freeboard has "tumbled-in" sides, with a curved flush deck and quadricircular junction to the sides of the hull, with light iron stanchions and wire rope or rods around the sides in place of a heavy rail and close bulwarks, without spars and rigging. As regards their alleged speed, there is not a single element furnished showing whereby greater effect is attained than there would be in a hull of the ordinary form, with like or equal areas of section, ease of lines and proportional power.

As to capacity and dead-weight ability, I fail to recognize how such a type of hull furnishes greater capacity, either for bulky cargo or dead weight. Quadri-circular top sides not only do not present a single advantage, but in loading with light freight the space lost by such conformation of sides is lost to stowage. Neither is it shown how they furnish capacity in excess of any other vessel of the usual proportions and constructed of like materials, neither does any such advantage as it is claimed exist, as equal volumes give equal capacity and like weights like displacement.

Stanchness, which is also claimed for them, is dependent upon the proportionate dimensions of a hull and the integrity of its construction, and as this quality is attained in the very greatest number of vessels of ordinary design, I equally fail to recognize the justice of the especial claim submitted by the writer for this type over that of other unrigged vessels.

Concerning their navigation, it is also claimed that the absence of the ordinary topgallant forecabin, deckhouses and like constructions on the spar deck enables them to offer less resistance to wind and seas, and as a result their operation is more effective. On the other hand, I advance that the flush deck, protected only by an open iron or wire rail, renders manual operations on deck in stormy weather wholly impracticable, and that erecting the wheelroom, cabin, berthing, galley and all deck requirements upon columns several feet above the spar deck presents more effective resistance to the wind than the deck constructions of our ordinary freighting steamers, added to which the facility afforded to the boarding of seas and the retardation occasioned by their impact more than offsets the advantage claimed.

Inasmuch as there are not any elements given why they should tow with great ease

and with greater economical consumption of fuel than other vessels, I am at a loss to consent to an operation that bears upon its face a negation of the axiom that like causes produce like effects. As the form of stem of a vessel is arbitrary with the designer, and as in practice it is presented in every practical outline, I am further at a loss to recognize any individual claim to the outline given or any advantage in a form of bow not water borne for a long distance, and hence subjected to the stress of the weight of anchors and chains upon it in a pitching sea.

Regarding their rolling qualities and stability, both of these operations depend upon form of immersed section of hull and location of center of gravity of the mass, and the conformation of one and the location of the other cannot be essentially affected by cutting off the upper corner of the gunwale. If the Charles W. Wetmore in her late voyage across the Atlantic in ballast had not had stowed the 600 tons of coal between decks she would have rolled and lurched to a degree that would have rendered her crew much pleased to make a port, hence that which is claimed as a merit was indispensable to safety of the vessel.

In conclusion, a review of all the elements submitted and claims advanced does not present or substantiate in any one instance an advantage over that of an ordinary and well-constructed freighting steamer of like displacement and power, and alike without spars or rig, subject to the question if such absence of spars is at all practicable with the requirements of safety of the vessel and crew.

Oldham's Reply.

Allow me to say in reply to Charles H. Haswell that the form of the whaleback's bow is such that about 700 feet of surface is saved by cutting away the dead wood or fore foot, and this with but slight reduction in dead weight ability, and thus on the skin friction theory of resistance the whaleback should steam as fast as a steamer of the same dead weight ability with about 5 per cent. less propelling power. Again, her extremely narrow stern may increase the speed coefficient, and the unincumbered decks will do so in a head wind. Like weights certainly do give like displacements, but like displacements do not always give like dead weight ability.

These vessels up to the present time are of similar proportionate dimensions to the ordinary lake steamer, which admittedly and unavoidably has excessive breadth of beam, giving them too much stability of form. The bold "tumble home" in the whalebacks reduces the length of the righting lever to a desirable extent, and thus lessens the shock at large angles of inclination. The rolling qualities of ships are most certainly directly and severely affected by other portions of hull than the immersed section when upright.

The new Spanish tariff relieves the present burdens on railroad rails and upon other railroad material. The tariff further contains only one column of duties for nations without treaties of commerce with Spain, and makes concessions upon those duties to nations disposed to make reciprocity treaties with Spain, such treaties to include the most favored nation clause. The export duty on iron ore will not exceed 25 centimes per ton. The new tariff was published on January 1.

Steam was gotten up on the ironclad Miantonomoh at the Brooklyn Navy Yard for the purpose of testing the starboard engines, the port ones having been previously tested. These engines were built by the Roaches in 1882, and as they have been idle since that time the officers were

uncertain about their efficiency. Whatever doubts the officers may have had as to the engines and boilers were well founded, for scarcely had steam reached the 80-pound point when there was an explosion. The gasket—a rubber ring inside of the manhole plate—had blown out of one of the boilers, and the fireroom was filled with live steam of the sort that scalds. Fortunately, the men in the fireroom were in a far corner when the gasket blew out, so that they escaped with their lives, but two of them were severely burned. A hose having been run into the furnaces, the fires were extinguished until a new gasket could be fitted.

Transportation of Ships.

One of the engineers of the Chiqueto Ship Marine Railway, H. G. C. Ketchum, at the invitation of the Canadian Society of Civil Engineers, read an interesting paper last week in Montreal, in part descriptive of the present state of that important work. Up to the time of suspension, the engineer's certificates for work done and materials furnished by the contractor amounted to about \$3,355,000. From a careful estimate, the cost to finish the works, to equip with rolling stock, and to provide for further engineering and administrative expenses is covered by \$1,500,000. The whole works may be said to be three-fourths done, and it would take but one summer season's work to entirely finish the ship railway and docks fit for opening to the public. The principal excavation yet to be done is that for the entrance channels at each end of the line, which have been commenced and are considerably advanced, but cannot be entirely finished until the hydraulic machinery for lifting the vessels is erected. All the hydraulic machinery, the rails, sleepers and permanent way materials have been delivered. The whole of the line of railway has been graded, with the exception of about a mile of broken work. Twelve miles of track have been laid, and the greater part of the bottom has been ballasted with broken stone. The costly work remaining to be done is the masonry and gate of the basin at the Bay of Fundy end of the line, and the masonry of the two lifting docks. The buildings containing the hydraulic pumping machinery have been nearly finished and the machinery in them erected. The ships' cradles, manufactured of steel, and the locomotives, are nearly ready for delivery. The moles protecting the basin of Northumberland Straits have been entirely finished and accepted. The firm of Easton & Anderson, who undertook the supply and erection of hydraulic machinery, as well as the traversers for shunting vessels, have agreed for a specified sum to work and maintain this machinery in good order for one year from the date of the opening of the line, the company being required to provide the coal. The size of vessel provided for is 1000 tons register; the maximum length would be 235 feet, breadth 56 feet, draft 15 feet with a displacement of 2000 tons. Accommodation space for six vessels of this size has been provided in the basin at each terminus of the ship railway. This is the only instance in the history of Canada where a wet dock and harbor basins and dredged entrance channels have been provided at the expense of a private company. The cost to the company of these entrance channels, dock gates sea walls, basins and moles will be, when finished, about \$1,000,000, exclusive of the hydraulic lifts.

Locomotive Engineering appears in a new form. It is edited by Angus Sinclair, formerly of the *Car Builder*, and John A. Hill of the old paper, who have become its proprietors.

STEAM BOILERS.*

BY JOHN J. HOGAN.

(Continued from page 1165.)

The water-tube boiler is a type of boiler different to the vertical water-tube boiler, and forms the most important class of these boilers. The demand for them is increasing, and their manufacturers are numerous in the United States and Europe. The form of inclined tubes which this class of boiler, Fig. 43, took some 20 years ago has been retained. Only changes of details of quality and methods of construction form the principal differences between the various makes. The manner of circulating the water is the

of shell boilers the question of circulation was of little importance. It is possible that this evident disregard for circulation in the shell boilers led the designers of the water-tube boilers into the error of at first slighting the laws of circulation. Imperfect circulation in boilers with large bodies of water is almost general. The consequences are waste of fuel and of material to strengthen the parts which are subjected to excessive strains from irregular expansion. In water-tube boilers the effect of the heat is concentrated on small bodies of water which are rapidly converted into steam. To meet this result rapid and definite circulation has to be provided, since the steam must be displaced by water as quickly as it is produced. If the exit passage for this steam is obstructed, pressure is the result, and the

of the subject of circulation with the assistance of a few diagrams is desirable. Diagram Fig. 44 represents a vessel to the bottom of which is connected a bent tube. The water is shown above the bottom of the vessel, covering the openings to the tube. In this diagram the first principles of circulation are shown. When the heat is applied at A the column of water at A D is heated, expands and is lighter than the column C E. The water, therefore, in C E descends, and, on account of its relative weight, displaces the water in A D. The heated water passes to the surface of the water in the vessel, and the water of a relatively lower temperature continues to pass down E C until all the water is heated.

Perfect Circulation.

When the heat is applied at A the

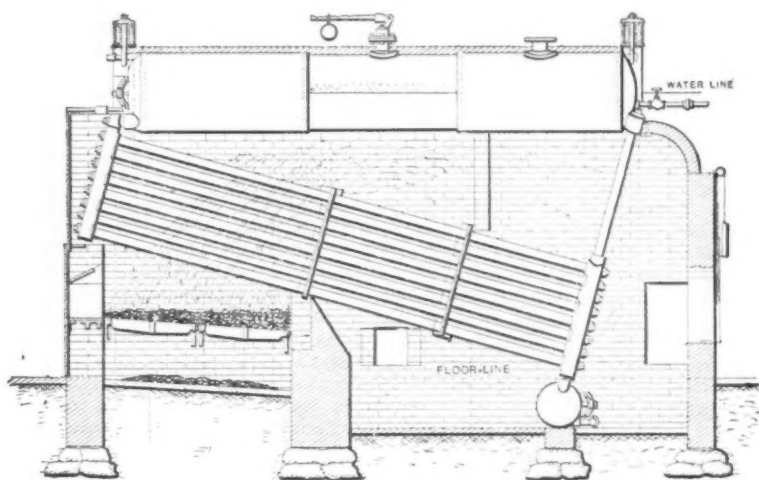


Fig. 43.—Babcock & Wilcox Water-Tube Boiler, American Practice.

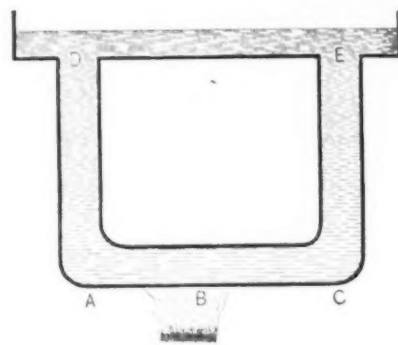


Fig. 44.—Circulation in Vertical and Horizontal Tubes.

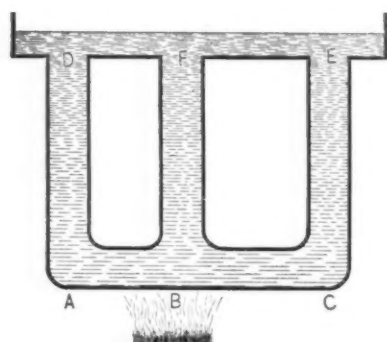


Fig. 45.—Circulation in Vertical and Horizontal Tubes.

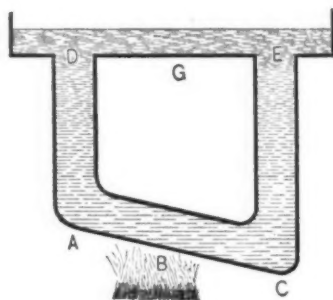


Fig. 46. Circulation in Vertical and Inclined Tubes.

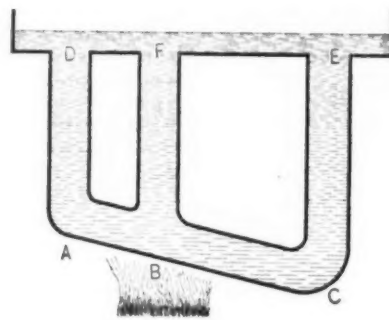


Fig. 47.

STEAM BOILERS.

same in all of them. There is another class of boiler, known as the "water-pipe boiler." The first difference between this boiler and the inclined water-tube boiler is in the size of the pipes, which are generally smaller than in the water-pipe boiler. The arrangement of pipes is various and intricate, inclined and vertical, bent and curved, circuitous in every possible way, so that to trace the course of circulation would be a difficult task. It is not improbable that in designing some of these boilers the subject of circulation was not considered.

Circulation Disregarded.

When the inclined water-tube boilers were first practically introduced, the want of proper provisions for the circulation of water caused some breakages and accidents. It has been seen that in the design

column of water which should displace the steam is not heavy enough to displace the steam and at the same time force it through the obstruction.

Obstructions to Circulation.

The causes of these obstructions may thus be summarized: 1. The presence of a comparatively motionless body of superincumbent water of relatively lower temperature than the steam produced. 2. The increase of temperature of the displacing column of water to nearly the same temperature as the steam, thus relatively reducing its weight. 3. Indefinite ways for the passage of the steam to the surface of the water and for the incoming water to displace the steam. 4. Tortuous passages having either too large areas, by which currents of relatively low temperature are maintained, or with too small areas, in which a frictional resistance is opposed to the free passage of the steam produced. The consideration

circulation may be said to be perfect, so long as the temperature in E C is relatively less than in E D. The temperature at A may be increased indefinitely and the water from E C will displace the heated water or steam in A D, provided the temperature of C E does not equal the temperature in A D. The application of heat at B produces less definite circulation, because if a high temperature is produced at B the temperatures in A D and C E may become equal and circulation will stop. By the addition of the tube B F in Fig. 45 circulation is secured down E C and up B F when the heat is applied at B. The circulation in the tube A D is, however, doubtful. If a high temperature is continued at B the water in E C may be only sufficient to displace the heated water in B F and the temperature between B and A will be too high to permit a downward current in D A. Another manner of securing circulation is shown

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in Fig. 46. The inclination of the tube A B C prevents the heated currents at B from going toward C, as they will naturally ascend to A D. If the temperature at B is continued and increased it is possible that steam may be formed more quickly than it can be displaced by water from E C, as the inclination of the tube A B C may not be sufficient to give a free vertical ascent. The application of heat at A, Fig. 46, and arrangements to secure at all times a relatively lower temperature in E C than in A D is probably one of the best forms to secure circulation. In Fig. 47 a vertical ascent is shown over B, where the heat is applied.

Displacement.

The inclination up to A D tends to secure a displacement of the heated water in A D as in B F, provided E C is large enough to admit the water required for displacement in the two columns B F and A D. The diagram Fig. 48 shows

F when the fire is applied at B. The temperature at B is relatively greater than at G and H, and column E C displaces the lighter body at B because it presents less resistance than the heavier bodies at G and H. The temperature at F will be relatively higher than at G and H. The circulation in D A will be slow and downward. Fig. 50 is a design in which the circulation will be uncertain when the heat is applied at B. In Fig. 51, with heat applied at B, the circulation will be continuous up B F and down E C and D A. Fig. 52 shows an outline of the inclined-tube boiler at an exaggerated angle. When heat is applied at B the circulation is toward A and D, with partial descending currents through G and H. The ascending currents are moved at two angles instead of one, as shown in preceding diagrams. The displacing or descending currents pass down an inclined plane in place of a vertical passage, thus reducing the velocity of their descent by friction.

pass up to deliver the steam at the surface of the water in the upper vessel or steam drum M. It is apparent that space K, not being exposed to any heat from the fire, and outside the passages, A D, is relatively of a lower temperature than any space between the vertically inclined passages A D at the front and C E at the back end of the boiler. This form of construction tends to relatively reduce the temperature of the ascending currents in A D. When heat is applied circulation is from B to A and up toward D with some descending currents through some of the tubes G and H toward E C. As the temperature of the fire increases, the number of descending currents in the tubes H and G lessen and become ascending currents.

Equilibrium Restored.

The upper or top tubes H will generally continue to maintain descending currents from D to L. By this circulation

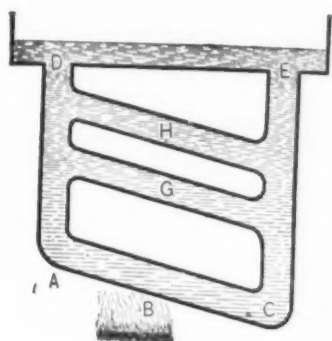


Fig. 48.

Circulation in Vertical and Inclined Tubes.

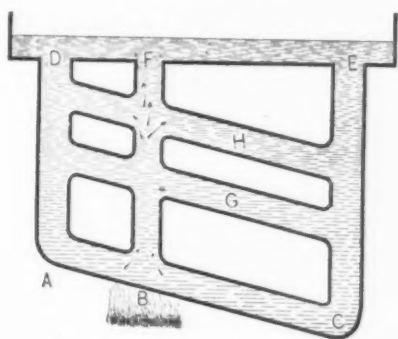


Fig. 49.

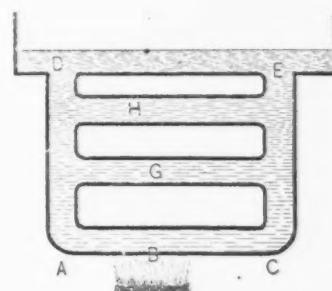


Fig. 50. —Circulation in Vertical and Horizontal Tubes.

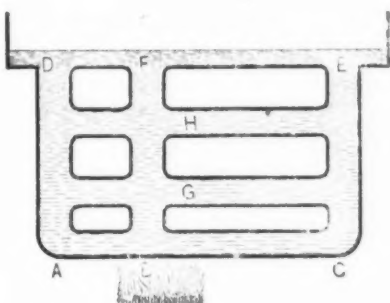


Fig. 51.—Circulation in Vertical and Horizontal Tubes.

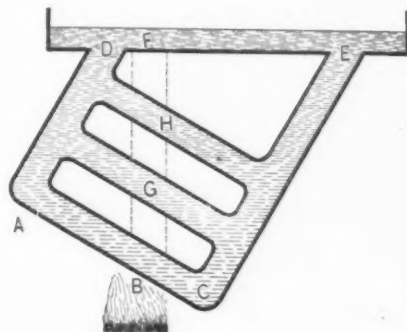


Fig. 52.—Circulation in Inclined Tubes.

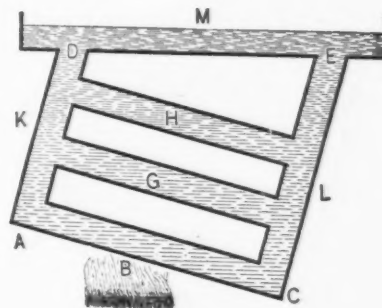


Fig. 53.—Circulation in Tubes of Inclined-Tube Boiler.

STEAM BOILERS.

three inclined tubes with the heat applied at B and affecting the tubes G and H above. If the water in H is displaced into the column of water A D at a higher temperature than the water from G, and the water from G at a higher temperature than the water from A B C, while E C remains at a relatively lower temperature than A D, the circulation will be good. Such conditions, however, are not attained in practice. The concentration of heat at B will be more liable to produce steam than if concentrated at the same point, as shown in Fig. 46, with one inclined tube. The heat in G and H being relatively less than in the water from B to A and from A to the opening to G in the tube A D, what might be termed a local circulation occurs. This circulation increases the temperature of the water through A G C without relatively raising the temperature in the water D G E and D H E, and results in the production of steam at B, which the heated water G C is not relatively heavy enough to displace. If the tube B F is introduced as shown in Fig. 49, the most rapid circulation will be down E C to C B and up B

Local circulation is possible and the currents of circulation are more indefinite than definite.

Circulation in Water-Tube Boilers.

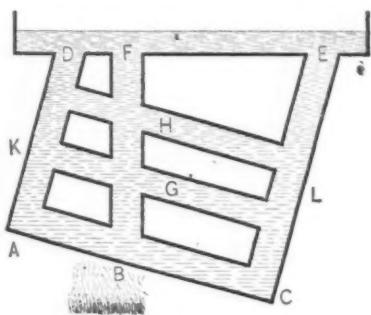
The diagram Fig. 53 represents the outline form of an inclined water-tube boiler, at the angle at which the tubes are usually placed. There are only three tubes in high shown, although in practice from 6 to 12 tubes are used. This will affect the consideration of the subject of circulation by simplifying the diagram, because the more numerous are the tubes in high, the more difficult it becomes to define the courses which the currents of circulation take. The tubes, which in practice are from 12 to 18 feet long, are staggered in the vertical rows and of these rows there are several in width. It should be observed that the actual construction in practice prevents the application of the heat at the point A, and that the greatest heat affects the tubes some feet from that point, say at B. The passages represented by A D are those in which the heated ascending currents

the temperature of the water in the descending passage is relatively increased and is possibly of a higher temperature than that in passage L to E, which it heats. The other result of this circulation is to equalize the relative temperatures in the two passages A D and C L E, and thus restore the equilibrium and stop circulation. As the fire is forced steam is produced at B, but it is not displaced, because the water column C L E is relatively too light and the column A D relatively too heavy, so that the former column is incapable of displacing the steam and forcing it through the obstructions due to the passage and to the relative difference in weight of the water in the passages. Circulation is therefore stopped and the production of steam continues until the temperature of the fire is reduced, or until the end passage breaks if the material composing it is not strong enough to withstand the strain due to the irregular expansion of the overheated tube which contained the steam and through which the circulation of water had ceased to pass. From this it may be inferred that the cir-

circulation is intermittent, and it is apparently true that a stoppage of circulation as described sometimes occurs, otherwise occasional ruptures would not take place.

A Field for Improvement.

The circulation in inclined water tube boilers still offers a field for some improvements. The direction which the efforts to improve have taken up the present time is on a variety of forms of inclined passages, but all retaining the same method of circulation. Of course with the existing circulation the passages offering the least frictional resistance in their form when not too large in area are the most desirable. But the water-tube boiler which will lead to the general adoption of this class of boiler will have to present more definite courses of circulation than the existing type presents and demonstrate with more certainty the capacity to maintain circulation with accelerated or natural drafts and at all temperatures. Fig. 54 represents the inclined-tube boiler with a vertical passage, B F. The improvement to circulation is



Steam Boilers.—Fig. 54.—Circulation in Inclined and Vertical Tubes.

obvious; but its application is impracticable. It may, however, assist in suggesting some practicable method of improving circulation in water-tube boilers.

(To be continued.)

James Dredge on the Columbian Exposition.

On his return to England, James Dredge, one of the British Commissioners, has placed before the English public, in an address at a meeting of the Society of Arts, very complete information concerning the Columbian Exposition. We reproduce below Mr. Dredge's conclusions, which will be read with interest, however much Americans may differ with him on certain points:

I hope I have made it clear that the pre-eminence of the Columbian Exposition may be fairly claimed by its organizers, not only because it will be far larger than any international exhibition that has preceded it, that is simply a law of natural development, but because of the real beauty and grandeur of its buildings, and, I think, because of the great variety, novelty and interest of its contents. The development of industry in the United States has advanced at such a prodigious rate of late years that no one can form even a faint idea of its present condition except by facts and figures, than which nothing is more misleading. Last year I ventured to suggest several reasons why this exhibition should be truly international, and to-day I find no reason to modify the opinions I then expressed. On the contrary, many significant facts combine to prove the correctness of those views, and that they were not overstated, at all events, so far as this country is concerned.

There is a very general feeling of resentment against the United States, because she surrounds her industries with a high barrier of tariffs. Nothing could be more unreasonable than this resentment. It is the business of every country to guard its welfare in the way which seems best to itself, whether by great armies, powerful navies or internal policy. And in spite of all the impediments placed in the way of our industries, no less than one sixth of our total exports find their way through the protected ports of North America. This vast volume of trade is carried on to the mutual benefit of sellers on this side and of buyers on the other side of the Atlantic. It seems to me that among these great interests involved there would be enough to occupy all the space that has been assigned to us at the exhibition. Again, we have many special industries the products of which are of the luxurious and costly kind, to acquire which is the privilege of wealth; and there is no country in the world that can compare with the United States in the number and capacity of such purchasers. This should prove a sufficient inducement to many manufacturers who may become exhibitors at Chicago, with every reasonable certainty of selling all that they may send, and of establishing permanent and profitable connections in the future. Americans are rapidly becoming leading patrons of art. The fact that most students from the United States go to Paris to study is probably the reason why the French school controls the American market. It is time that this condition of things is changed; and there is little doubt that it will be changed, if English artists respond to the invitation to exhibit, and are fitly represented in the noble Gallery of Fine Arts that will form so conspicuous a figure at the Chicago exhibition. English sentiments still remain deeply implanted in American nature, and will respond freely to the feelings expressed by the noble English school, which won so much admiration and surprise at the Paris Exhibition of 1889.

I have pointed out that it is the avowed intention, in American official quarters, to make a bold stroke at our South American trade, and to wrest from us as much of our commerce in the Western Southern hemisphere, and elsewhere, as may be possible. Being forewarned of this approaching struggle, which is without unfairness and without bitterness, our manufacturers should be forearmed, and, by carrying the war into our commercial enemies' camp, should turn the exhibition to their advantage, and prove to all the world the incontestible superiority of the goods which we export, both as regards quality and price. Whatever benefits the United States may derive from the policy of high tariffs, it is certain that such complete protection must act prejudicially on many industries, both as regard the quality of goods produced and the cost of producing them. This is an inevitable consequence of the absence of the healthy stimulus of competition. When, therefore, foreign purchasers have an opportunity of comparing at Chicago the relative values of our own goods side by side with similar articles made in the United States, I think there need be little fear of the result. Of course this has not a universal application; we cannot expect to hold the lead in every branch of manufacture, and it must be frankly admitted—and admitted, I hope, with due admiration of American ingenuity, skill and enterprise—that in many things the United States has left us far behind. Any attempt at competition in those directions would, of course, be useless, and only lead to disappointment and loss of money.

Another important inducement to manufacturers to be present at Chicago must not be lost sight of. The number of

Americans visiting Europe increases year by year; for the most part they are wealthy and leave large sums of money behind them, and, fortunately for our trade, England is rising in favor with these visitors. Many shopkeepers and manufacturers enjoy great support from American customers, and it would be bad policy for them to neglect the means which will be afforded them in 1893 for increasing this support and making new connections. Exhibitors of such goods as the wealthy American tourist loves to buy will be remembered long after the exhibition has been closed, and will be sought for in England by visitors who will remember their displays at the exhibition.

To the horticulturist the coming exhibition affords the certainty of a rich harvest, for as it has already been pointed out, our pre-eminence in flower culture is undisputed, and this branch of industry is less hampered by tariff obstacles than most others.

Much machinery of varied classes may be exhibited with profit, chiefly for the benefit of foreign customers, but in some cases also to meet the demands of the American market. A large exhibit of objects connected with transportation—such as railway rolling stock and ship models—may be confidently expected; these would be shown, not with the expectation of any actual trade benefit, but for the information of Americans who sooner or later will visit Europe. With a more direct purpose, the manufacturers of bicycles and tricycles may be expected to attend, for they represent a very important industry, in which this country takes an undoubted lead. Patentees of machinery and other processes may, if their exhibits possess real merit, fairly hope to do business in the United States, and our most advanced steam-engine practice will certainly be represented there on a large scale. Altogether, one way and another, we may fairly hope that the area allotted to us in the Machinery Hall will be filled with representative exhibits, and that the displays in the Electricity and Mining buildings will not be unworthy of the country. As regards agricultural exhibits, American manufacturers have taken so decided a lead in the implement trade that there appears but a slender chance for the British exhibitor in America, but the classification in this department is so wide and varied that it embraces many objects in which we can be represented with profit; especially this is the case with live stock for breeding purposes, for which there is always a demand in the United States, and an exemption from duty.

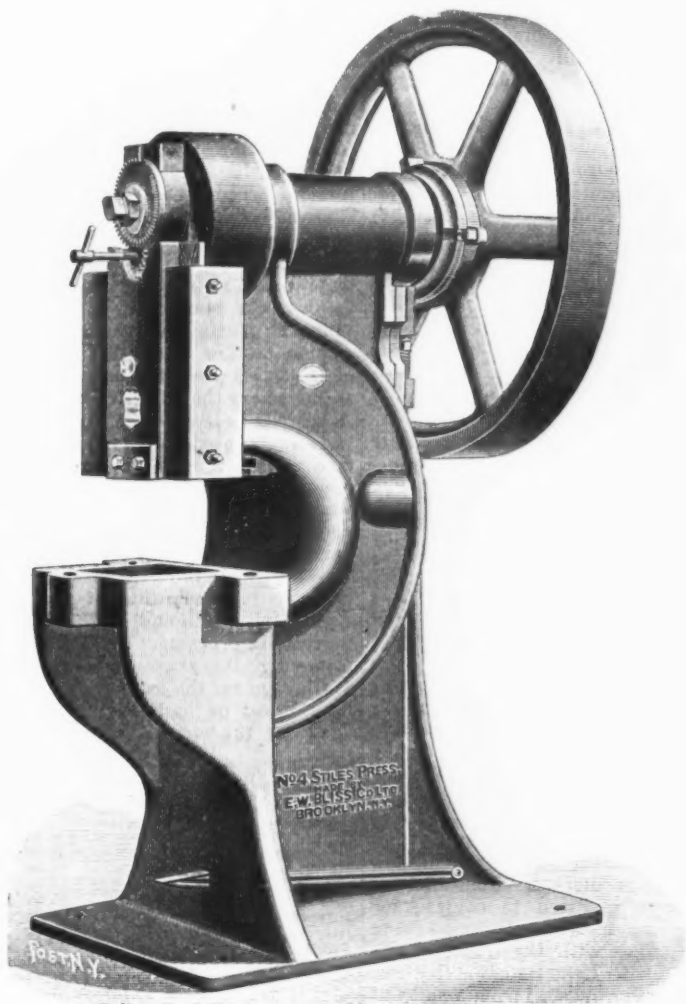
To urge manufacturers to incur the trouble and expense of exhibiting at the Chicago exhibition, on the merely sentimental ground of aiding in the triumph of a great work, would be absurd, although there are idealists on both sides of the Atlantic who see in the general advancement of humanity sufficient reason for demanding on the part of others large pecuniary sacrifices. But an exhibition can only be successful as a commercial enterprise, and any manufacturer would be as foolish to participate without reasonable prospect of benefit as he would be to abstain from mere prejudice against the tariff. Let our manufacturers consider, therefore, carefully before deciding; they can obtain sufficient data from which to form a fair appreciation of the chances of profit or loss, and if the odds are in favor of the former, they may go to Chicago certain of a reception such as they have never experienced before at any international exhibition; a reception based on true generosity and friendship from a nation speaking their own language, bound to them by ties of kinship and by community of sentiment; competitors only so far as competition is inseparable in the struggle for pre-eminence.

The Stiles Power Punching Press.

The E. W. Bliss Company, Limited, of Brooklyn, N. Y., have just introduced a line of Stiles power punching presses, adapted to nearly every kind of blank cutting, punching, perforating, forming and bending, &c. The frame is so designed as to combine strength and rigidity with convenience for handling the dies and material. The pitman is made of steel, instead of cast iron, as in most presses of this kind, and rests with its lower end on a solid seat worked in the slide. The crank pin runs in gun-metal bushings, which can be readily renewed

the frame, to which strippers, gauges and other fixtures can be fastened in different positions.

The Greathead system of electric railways in deep tunnels is about to be greatly enlarged in London. The first venture of this kind was the City and South London Railway, extending for 3½ miles from the Monument, partly under the Thames River, to Stockwell. Although in great measure experimental, the system has proved a practical success. The new tunnels are to be larger, the diameter of those proposed being 11½ feet, against the 10 feet in the present ones. The cars are to be larger and of more comfortable pattern



THE STILES POWER PUNCHING PRESS.

when necessary. The eccentric adjustment not only permits of rapid and very accurate adjustment, but transmits the pressure entirely through solid metal, instead of throwing it upon screw threads. By this device the stroke is not changed, but the punch is raised and lowered (according to the direction in which the disk, shown at the upper left-hand corner of the engraving, is turned) to suit different thicknesses of dies. The graduated adjustment, marked 1/16 inch on the eccentric disk, enables the operator to keep an exact record of the dies and set them without loss of time. The automatic clutch allows the shafts to be turned for setting the dies while the wheel is in motion, without endangering the operator, as it is impossible to start the press by any accidental pressure upon the treadle. A T-slot is cast on the throat of

also. One other circumstance is that the new tunnels will be along a route of remarkably great travel and traffic. One end of it will be in the city proper, alongside the Bank of England and the Royal Exchange. The other end will be to the westward at Shepherd's Bush, about 6 miles distant. The route, it will be seen, is right through the heart of the city.

Mr. Reinberz, the Barge Office representative of the United Hebrew Charities, says that the total number of Russian Hebrew refugees landed at this port each month averages about 3500. Of this number 1500 are comparative paupers, having in no case more than \$50. The number of absolute paupers is very small. Of the 1500 comparative paupers less than 10 per cent. remain in the city. Those that do remain are able to take care of themselves; the others are sent to the South and West.

The Chicago Iron Trade in 1891.**General Remarks.**

The leading features of the iron trade in 1891 may be stated as follows:

1. There was an unprecedented shrinkage in the volume of business in the first half of the year. Not even after the panic of 1873 was the rate of reduction so rapid.

2. The recovery in the last half of the year was almost as remarkable as the shrinkage in the first half. The resumption of activity in the production of iron and steel was too great, however, for the demand, and any tendency toward improvement in prices was speedily checked.

3. A very heavy increase was made in productive capacity. In most cases these improvements were begun in 1890, but their force was not felt until they were completed in 1891.

4. Prices of both pig iron and steel rails showed singularly narrow fluctuations during the year. Pig iron was evidently down to hard pan and could not be forced much lower. Steel rails were sustained by an agreement among the manufacturers, which was faithfully adhered to despite the restricted business thus enforced upon each company.

5. There was an unexpected weakness in the price of finished iron and steel in the closing months of the year, when all conditions seemed to favor advancing rather than declining rates.

6. The most astute members of the trade were egregiously deceived as to a return of prosperity in the latter part of the year.

7. The number of failures among iron and steel manufacturers was very small considering the wretched condition of business for most of the year and the exceedingly narrow margin of profit upon which they were operating.

8. In marked contrast with the iron trade generally, the manufacturers of agricultural implements enjoyed a year of wonderful prosperity. The wagon and carriage makers, the plow makers, the stove manufacturers, the jobbers of heavy hardware and blacksmiths' supplies, and, in short, all whose business brought them into direct relations with the farmers, have every reason to regard 1891 as a bright year in their history.

Special Features of the Local Trade.

The productive capacity of local establishments was considerably enlarged in 1891. Four new blast furnaces were completed by the Illinois Steel Company and one new furnace by the Iroquois Furnace Company, all at South Chicago and all of the most improved designs. The local pig-iron makers have to a greater extent than ever before absorbed the trade of the Chicago district in coke pig iron, almost completely shutting out Ohio iron, which was once an important factor in that market, and greatly restricting the consumption of Southern coke iron. Fully one-eighth of the pig iron trade of the entire country is now centered in Chicago. The new rail mill of the Illinois Steel Company at South Chicago was also first given an opportunity to show its capacity this year, and in the month of October rolled 34,381 gross tons of rails, while the converting works connected with it turned out 42,638 tons of Bessemer ingots, surpassing in both items the best work hitherto done by any other establishment in the world. In 1891 the tonnage of rails of the Illinois Steel Company decreased 30 per cent., as compared with 1890, and yet their output of pig iron and of spiegeleisen fell off only 6½ per cent. During active times in the rail market the Illinois Steel Company were heavy purchasers of pig iron. That time has now passed since their pig pro-

ducing capacity has been so largely increased. Important additions were also made in other lines. The Chicago Ship-building Company, destined to be a very important factor in the Chicago iron and steel trade, launched their first vessel in March. The Washburn & Moen Mfg. Company built a large rod-rolling mill and a wire-drawing plant at Waukegan, which is in the Chicago district. The construction of the Grant Locomotive Works in one of Chicago's suburbs was actively prosecuted, making another large consumer of iron and steel whose influence will shortly be felt. Fraser & Chalmers, manufacturers of mining machinery, began the erection of an enormous plant, which is to be much larger than their old one. The Chicago Wire and Spring Company are now building an immense wire mill at Wireton Park, a Chicago suburb. At Joliet, which comes under the purview of Chicago, great improvements have been made the past year. The Lambert & Bishop Wire Fence Company have doubled the capacity of their wire mill, barb wire factory and wire nail factory, while the Joliet Enterprise Company are building a wire mill and barb wire and wire nail factory very much larger than their old plant, which was destroyed by fire some months since. At Harvey quite a number of important establishments consuming iron and steel have been built and started during the past year, with others coming forward rapidly. At Hammond the Lakeside Nail Company have doubled their capacity for the manufacture of steel cut nails, notwithstanding the general dullness of the nail trade and a declining market. Three sheet mills are expected to be erected during the coming year in the vicinity of Chicago, two of them at Joliet and one at Hammond. Other enterprises of a less pretentious character almost without number have sprung up in Chicago and its environs, and a year or two of prosperous business is all that is needed to give the iron trade of the district an impetus which will make its future growth as surprising as anything heretofore accomplished in this marvelous city.

Influences Affecting Prices.

The depression in trade, which was most marked in the first quarter of the year, was due mainly to the slack demand from the railroads. They were directly affected by the financial stringency which set in toward the close of 1889, and which for a time prevented them from placing securities. Their traffic also fell off heavily in consequence partly of a short corn crop, and partly of the diminution in general business induced by the financial depression. It became absolutely necessary for even the wealthiest railroad corporations to retrench in every way possible. Repairs were only undertaken wherever absolutely necessary. Chicago is the foremost city in the world in the manufacture of railroad supplies, and therefore the economical policy of railroad managers was most severely felt by its business men. The iron trade was, of course, the greatest sufferer. There was but one failure of any magnitude, that of the National Forge and Iron Company, and that was caused mainly by insufficient capital. It was perhaps fortunate that for some time after the year opened the production of pig iron was heavily curtailed by the shutting down of the Mahoning and Shenango valley furnaces, the coal miners' strike in the South and the strike in the Connellsville coke district. The production of pig iron was thus restricted, for the time to the actual requirements of the market. But for these circumstances it is possible that prices would have gone much lower than they did before manufacturers would have voluntarily dropped out of the competition for business.

Pig Iron.

January was a month of considerable activity in coke iron. Prices were the lowest ever known in this market, and most consumers felt that they were taking very little risk in covering their requirements for at least the first half of the year. There was also some apprehension among them that the general shutting down of the Mahoning and Shenango valley furnaces and the strike of Southern coal miners might curtail the production sufficiently to affect prices. Lake Superior charcoal developed some weakness, and the price eased off about 50 cents per ton on rather light business. February witnessed a slight improvement in coke iron, the situation becoming interesting by the strike of the Connellsville coke workers. An advance of about 50 cents per ton was made on both Northern and Southern brands. For the time being the possibility of cheaper Lake Superior ores had no influence on the market, as the production of pig iron was seen to be rapidly falling off. Lake Superior charcoal was not affected by this condition of the coke-iron market, but continued neglected and inclined to weakness. The Illinois Steel Company this month began the sale of spiegeleisen to outside consumers, their output being in excess of their own requirements. March was a quiet month in coke iron, but rather active in charcoal, the makers of malleable castings purchasing heavily for long deliveries. Ohio softeners were now growing scarce on account of the large number of furnaces out of blast. In April the makers of Lake Superior charcoal were unable to resist the pressure and prices gave way to \$16.50 to \$17, below anything previously known in the history of the Chicago charcoal iron trade. Large transactions occurred at these figures, which were declared ruinous by the makers, and a great deal of talk was heard relative to suspension of operations by a number of stacks, which, however, did not take place then or even soon after. Coke iron continued firm this month, as the coke strike still dragged along, making some qualities quite scarce. The opening of the building season induced some activity among the architectural foundries, increasing the demand for coke iron. May was a month of very heavy transactions in all kinds of iron. The business of this month is believed to have been of a magnitude unprecedented in this market. Consumers of coke iron were prepared to contract for long deliveries, and manufacturers were ready to negotiate with them, as the coke strike was ended. Lake Superior charcoal was also in strong demand from makers of malleable castings and agricultural implements. Crop prospects were better than for years, and a general feeling of hopefulness obtained. Prices were firm and in some cases advances were realized over rates previously ruling. June was a quiet month, consumers being well supplied. Reports were current of weakness in Southern coke, caused, it was afterward learned, by the effort of one company to dispose of an overstock of low-grade iron. July opened up well, with a good demand and firm prices, but as the month passed there were ominous indications of financial stringency. Up to this time the West had not seriously felt the heavy drain of gold to Europe, but now the local banks began to curtail disbursements of industrial paper, partly because they were being drawn upon by Eastern banks and partly because they felt compelled to make provision for the movement of the crops. Enterprise was chilled and prices drooped both for coke and charcoal iron. In August, however, there was some improvement, as it was seen that the danger of financial stringency was remote. Business improved, but it was of a spasmodic character which was not calculated

to strengthen prices. September was a very active month, and coke iron prices would probably have advanced with the heavy buying in progress had it not been for competition among local makers, now numbering four concerns. Southern charcoal was also sold here for foundry purposes at low prices. Car-wheel makers made inquiry for Lake Superior charcoal iron, but withheld contracts in the hope of being able to work prices down to the May and June basis. October saw Lake charcoal prices again broken in the competition among sellers for a 1500 ton order. Coke iron was in fair demand during the month, with very heavy sales of Southern to large Detroit consumers. November was a gloomy month in the pig-iron trade. The demand for coke iron was not large, and concessions were freely made to secure the limited business in sight. Consumers quite generally requested the postponement of deliveries on old contracts. Lake Superior charcoal was sold at the lowest prices of the year. Large blocks were taken by concerns whose policy is known to be that of purchasing undoubted bargains. The pressure became too great for some of the charcoal companies, and they blew out their furnaces. And yet, at this time, prospects were brightening in a general way. The railroads were known to be again in the market for supplies for next year and placing heavy contracts for rails, cars and other material. The early part of December proved to be as unsatisfactory as November, but a better tone gradually developed as it was seen that the railroads were again becoming large consumers of iron and steel, and the last half of the month numerous contracts for coke iron were booked. Prices, however, ruled about as low as at any time during the year, No. 2 foundry being particularly weak, owing to the large production. Lake Superior charcoal did not participate in this activity, although inquiries indicated an early improvement in the demand. The following table shows the course of prices at Chicago for the leading varieties of pig iron, based on cash payments, and averaged for the month from weekly quotations:

Months.	Local No. 1. coke	Lake Superior charcoal.	Ohio strong soft No. 1.	South'n Coke No. 1.
January	\$15.25	\$18.50	\$18.55	\$16.00
February	15.50	18.25	18.25	16.25
March	15.50	18.00	18.50	16.25
April	15.75	18.00	18.50	16.25
May	15.50	17.00	18.25	16.00
June	15.50	16.75	18.25	16.00
July	15.50	17.00	18.00	16.00
August	15.75	17.00	17.75	15.75
September	15.75	17.25	17.75	15.75
October	15.50	17.00	17.75	15.75
November	15.50	17.00	17.75	15.50
December	15.50	16.75	17.75	15.50
Average for year	\$15.54	\$17.37½	\$18.06	\$15.92
Average for 1890	17.50	20.81	19.96	17.25
Average for 1889	16.75	19.39½	18.81	16.77

Prior to 1891 the lowest average price for any year had been recorded for 1889. It will be seen by the above comparative statement that a still lower range of values prevailed in 1891, which thus becomes the worst year, so far as known, in the Chicago pig-iron trade.

Finished Iron.

The year just ended was a particularly gloomy period for the manufacturers of bars, angles, plates and sheets. Out of four rolling mills in Chicago built to roll bar iron, but one was in operation at the close of the year, and its product does not come upon the general market. The others were closed either through bankruptcy or because the owners could see no profit in the business. Bar iron had sold at lower prices in previous years of depression, but raw material was then cheaper. The direct cause of the depression in bar iron was the absence of

business originating with the railroads. Car works and railroad repair shops were either idle or but partly employed during the greater part of the year. The mainstay of the trade in bar iron in 1891 was the unusually heavy demand from the agricultural interests. Had it not been for this fortunate condition of affairs the manufacturers of bar iron would have had a very poor year in their Northwestern market. Angles and plates suffered from the depression in bridge building and other branches of the engineering trades. For months at a time the boiler makers and tank builders purchased very meagerly, carrying practically no stocks. It is worth noting in this connection that in 1891 more Eastern plate manufacturers established agencies in Chicago than had been the case for many years. The brisk competition for business which ensued reduced prices on all kinds of steel plates to absolutely profitless figures. Sheet iron and galvanized iron passed through periods of great activity and extreme depression, touching remarkably low prices when depressed and showing but little improvement in values when active. The year ended with a better tone in all these products. Monthly average prices for mill lots at Chicago were as follows:

Months.	Common bars. Cents.	Angles. Cents.	No. 27 sheets. Cents.
January.....	1.70	2.30	2.95
February.....	1.72½	2.25	2.95
March.....	1.70	2.25	3.00
April.....	1.65	2.25	2.95
May.....	1.65	2.25	3.00
June.....	1.67½	2.15	3.00
July.....	1.67½	2.10	2.95
August.....	1.67½	2.10	2.95
September.....	1.75	2.10	2.95
October.....	1.75	2.05	2.95
November.....	1.67½	2.10	2.90
December.....	1.70	2.10	2.95
Average for year.....	1.70	2.17	2.95
Average for 1890.....	1.82	2.37½	3.17
Average for 1889.....	1.68	2.20	3.21

Steel Rails.

The year opened with but little business booked by the local manufacturers beyond orders entered by the leading systems of the Northwest, who estimated their season's requirements very moderately. The outlook was discouraging. Eastern mills entered the field as active competitors for Western business. Prices dropped from \$31 to \$30. The local mills were idle the whole of January and part of February, when the South Chicago works were started after seven weeks' suspension. In February the demand improved to some extent and an agreement was effected among the manufacturers by which the Chicago price was fixed at \$31. March tonnage was moderately good, but considerable Western business fell into the hands of the Colorado mill. The situation brightened in April, and from that time until July there was a prospect of heavy business, which materialized but slowly on account of the financial situation. Accumulated orders, however, enabled the Union Works to be started in July after a suspension of operations lasting from the previous fall. Large orders were subsequently booked, and an unusually active trade was done in light rails for logging operations and mines and in street rails. August business in standard sections was not large, and in September inquiries began to be made for deliveries in 1892, showing that railroads now felt certain of the future. Actual business entered was not large, however, either in September or October, but in November and December numerous orders were entered for delivery in 1892. Roads which had taken 10,000 tons the past year contracted for 25,000 tons the coming year, and others which had bought very sparingly for some time took round lots. The Union Works shut down in November, but the South Chicago Works continued in operation until closed

for the holidays and for annual repairs. The year ended with a heavier tonnage assured than had been the case for the two preceding years. A revival in railroad building is expected, as conditions are now more in favor of such a movement than has been the case for several years. The track laid in 1891 was but a trifle over 4000 miles, being the lowest since 1885, when 3131 miles were laid. The mileage laid in the Northwest in 1891 was 33½ per cent. below that of 1890. Prices were not materially advanced during the year except for small lots. The following table of quotations shows how little values fluctuated during the year:

Jan.....	\$30.00 to \$31.50	July.....	\$31.00 to \$32.00
Feb.....	31.00 to 32.00	Aug.....	31.50 to 33.00
March.....	31.00 to 32.00	Sept.....	31.50 to 33.00
April.....	31.00 to 32.00	Oct.....	31.50 to 33.00
May.....	31.00 to 32.00	Nov.....	31.00 to 33.00
June.....	31.00 to 32.00	Dec.....	31.00 to 33.00

The average for the year on large lots was \$31, as against \$34.50 in 1880 and \$31.37½ in 1889.

Merchant Steel.

At the close of 1890 the manufacturers of harvesting machinery had effected a consolidation which included so many large consumers of steel that it was expected to have an important effect upon the trade. It proved but short lived, however, resolving itself into its original elements. The agricultural implement manufacturers consumed larger quantities of steel in 1891 than in 1890, when their contracts were so large as to attract attention in all quarters. In the absence of the railroad demand this did not sustain prices, which dropped to lower figures than had before been known for open-hearth spring, machinery and tire steels. Competition of an unusual character among the crucible steel makers reduced the price of tool steel to a very low rate. Bessemer bars also touched extremely low depths, contracts having been placed in June by large implement works at very close to bar-iron prices. The following table shows the course of prices in leading varieties of steel, in carload lots, from Chicago, averaged monthly from weekly quotations:

Months.	O. H. spring. Cents.	O. H. mach'y. Cents.	Ordinary tool. Cents.
January.....	2.50	2.50	7.00
February.....	2.50	2.40	6.75
March.....	2.50	2.40	6.75
April.....	2.50	2.30	6.50
May.....	2.50	2.30	6.50
June.....	2.40	2.30	7.00
July.....	2.40	2.30	7.00
August.....	2.40	2.30	7.00
September.....	2.25	2.25	6.50
October.....	2.25	2.30	6.50
November.....	2.25	2.30	6.50
December.....	2.25	2.25	6.25
Average for year.....	2.40	2.32	6.70
Average for 1890.....	2.75	2.70	6.25
Average for 1889.....	2.41	2.50	7.75

Old Material.

The course of trade in old material was very discouraging to those who make it their special business. The demand was light for a large part of the year, and local consumers of wrought scrap were fewer than for years. Yet the closing of Chicago bar mills did not so cheapen the price of material as to stimulate speculation in it. Holders of scrap maintained its value remarkably. Old iron rails were at no time very plentiful, yet there were usually more offering than the market would take. For the first time in many years old rails sold lower in the fall months than in May and June. The following table presents monthly average prices of leading kinds of old material at Chicago, old rails being quoted per gross ton and the other per net ton:

Months.	Old rails. Cents.	No. 1 iron forges. Cents.	No. 1 mill scrap. Cents.	Cast scrap. Cents.
January.....	\$23.00	\$18.25	\$14.00	\$12.50
February.....	23.00	18.50	13.75	12.50
March.....	23.25	18.50	13.75	12.25
April.....	22.75	18.25	13.50	12.00
May.....	22.75	18.50	13.50	12.00
June.....	22.75	18.50	13.75	12.25

July.....	23.25	18.75	14.25	12.00
August.....	23.00	19.00	14.50	12.75
September.....	23.00	18.50	14.25	12.25
October.....	22.25	18.25	13.75	12.25
November.....	22.00	17.75	13.25	12.00
December.....	21.75	17.50	12.50	12.00

Average for year.....	\$22.75	\$18.35	\$13.75	\$12.25
Average for 1890.....	25.00	19.75	15.62	13.37½
Average for 1889.....	22.37½	19.42	14.56	12.60

Other Features of the Trade.

The building interests were fairly active during the year, threatened labor troubles passing over without serious consequences. Increased quantities of iron and steel were consumed in the erection of large office buildings, boilers, warehouses, &c. The record of 1891 in respect of all structures built with steel frame work surpasses that of any previous year. The World's Fair buildings, on which construction was actively pushed, largely increased the local consumption of iron and steel in the form of nails, galvanized iron and general structural material. The iron trade throughout the country was so depressed, however, in 1891, that the large quantities of material needed for these buildings were available at extremely low prices, enabling the work of construction to be prosecuted at much less than the estimates.

Taken as a whole, the iron interests of Chicago have fared fully as well as those of any other section, in a year which may be termed a period of severe depression. In some respects the Chicago iron trade was in better condition than that of other sections. This, however, was a disadvantage so far as it invited the manufacturers of other localities to make Chicago a dumping ground for their surplus product. The prospects for the coming year are now of the brightest. Full employment is already assured for the steel rail mills. The railroads are in funds and are making liberal purchases of equipment and general supplies. The farmers of the Northwest are tasting the sweets of prosperity, and will draw heavily on the stocks of goods with which Chicago merchants are ready to furnish them. Building projects are as numerous for the coming year as for any past year throughout the Northwest. In every direction the indications point to a largely increased demand for iron and steel products, and especially for those in the production of which Chicago excels.

Commercial Value of Foreign Coins.

The Director of the Mint has estimated and the Secretary of the Treasury has proclaimed the values of all foreign coins to be followed in estimating the values of all foreign merchandise exported to the United States after January 1, 1892. The values of the following coins have been changed:

	Value October 1, 1891.	Value January 1, 1892.
Florin of Austria-Hungary.....	\$0.357	\$0.341
Boliviano of Bolivia.....	.723	.691
Peso of Central American States.....	.723	.691
Shanghai tael of China.....	1.068	1.021
Haikwan tael of China.....	1.189	1.137
Peso of Colombia.....	.723	.691
Sucre of Ecuador.....	.723	.691
Rupie of India.....	.343	.328
Yen of Japan.....	.779	.745
Dollar of Mexico.....	.785	.750
Sol of Peru.....	.723	.691
Rouble of Russia.....	.578	.553
Rouble of Russia (gold).....	.772	.772
Mahbub of Tripoli.....	.652	.623
Bolivar of Venezuela.....	.145	.133

For the first time the Director of the Mint has estimated the value of the gold rouble of Russia, and our consuls in Russia have been instructed to certify hereafter the depreciation of the paper money, which is the practical currency of Russia, from the gold standard instead of from the value of the silver rouble, as heretofore.

Some \$200,000 has been subscribed in Boston toward establishing works for building cylindrical steel cars.

The Duquesne Steel Works.

Since the Duquesne works passed into the control of Carnegie Bros. & Co., Limited, they have been considerably improved in some respects, and have been adapted to special requirements. The mill was originally designed as a rail mill, with arrangements perfected to ship also 4-inch billets. The entire equipment as a rail mill still remains, and the works can at short notice be turned upon rails. The firm have, however, achieved remarkable results in adapting the plant to the rolling direct, in one heat, $1\frac{1}{2}$ -inch billets from $16\frac{1}{2}$ by 18 inch ingots. In this respect its achievement unquestionably stands unparalleled on either side of the Atlantic. The converting department, which originally consisted of two 5-ton converters, has been strengthened so that the capacity of the vessels is now 7 tons each. They are located in an L from the main building, blowing out sideways. The back of the L is occupied by the cupola plant, placed high enough to allow of tapping into an iron ladle from which the pouring is done direct into the tilted converters. The cupola plant has been modified from the original design, three open-top 10-foot cupolas being substituted for the 8-foot cupolas which formerly occupied their place. One of the old sized cupolas remains. The spiegel cupola taps into a ladle which is transferred to a crane commanding both vessels. The iron ladle runs on a track, provided at each end with a pair of scales, so that the exact charge can be determined. The ferro is preheated in a small reverberatory furnace. The ladle crane occupies a position between the two converters. For changing ladles a crane transfers to an adjoining pit, where trunnion rests are provided for the old and new ladle. The blowing machinery, pressure pumps, Sturtevant blowers, &c., are located in an adjoining building. There are three vertical Mackintosh, Hemphill & Co., Limited, blowing engines, 31 by 46 by 48 inch stroke. The ingots, which weigh from 3500 to 4000 pounds, are transferred to pits, the original mill having six, to which eight on the other side of the blooming mill have since been added.

The blooming mill is a 28-inch train driven by a pair of 28 x 48 inch reversing horizontal engines. At a distance of 75 feet from the center line of the blooming rolls lies the three-high 26-inch roughing train, equipped with Treat tables, which while they lift the bloom at the same time swing laterally to bring it to the next pass. This train, in which the bloom makes five passes, is driven by a 46 x 60 horizontal engine, having a 75-ton fly wheel. From this roughing train the billet is conveyed by driven rollers to the intermediate train. While passing along this conveyer the billet is turned, which insures specially accurate square rolling of the billets. Between the blooming mill and the roughing train is located a power driven horizontal shears, the bloom ends being delivered out of the mill laterally by a special conveyer. On the conveyer from the roughing rolls to the intermediate trains is located a switch, by which the billet from the roughing train may either be sent through one pass in the intermediate train, which rolls it into a 4 inch billet, or be diverted to the first of six passes by which it is rolled into $1\frac{1}{2}$ -inch billets. When rolling small billets one-half the product of the roughing train is diverted to 4 inch billets, which after leaving the only pass in the intermediate train are carried along by rollers to the shear, which is powerful enough to shear two billets at a time. The crop ends drop below the shear and by conveyer are taken out of the building laterally, being delivered into a car on the

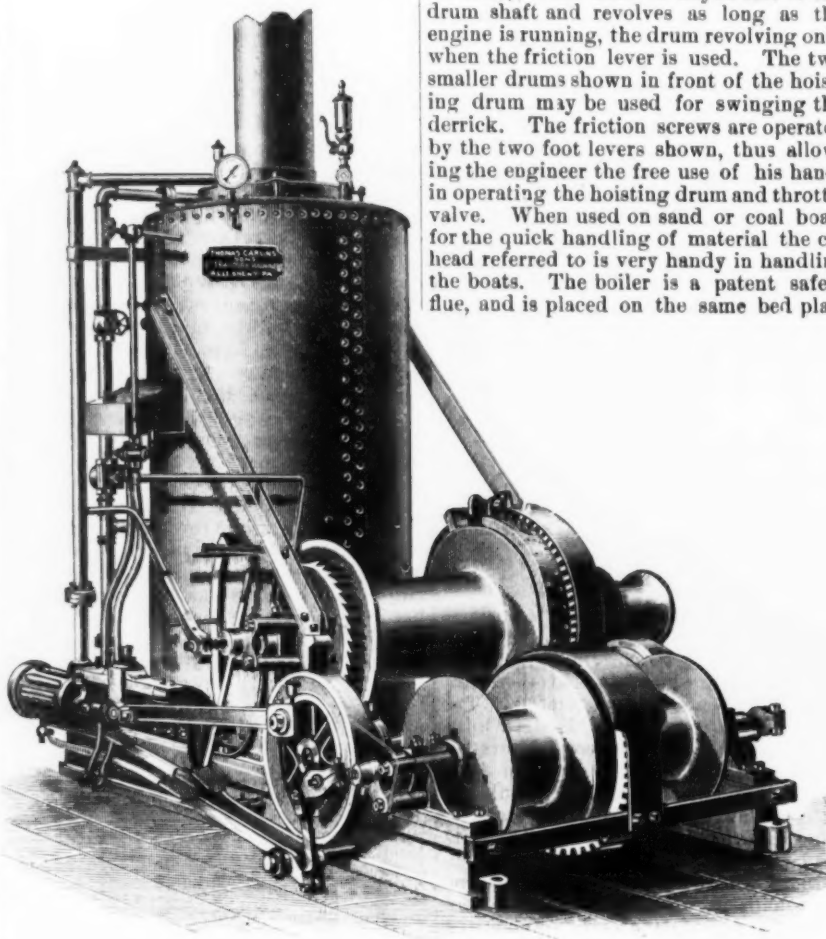
siding alongside the mill. One of the sheared 4-inch billets is carried along to a stop, which holds it back until its mate has passed along the rollers, it then follows it. The billets fall upon a conveyer, which, gradually rising, carries them overhead out of the mill for a distance of 200 feet. There a turn at right angles is made, the conveyer extending for a distance of 350 feet along the shipping wharf, in which the cars stand on a depressed track.

We may now follow that part of the product which is to be converted into $1\frac{1}{2}$ -inch billets direct. As stated, it is given one pass in the intermediate train, which is driven by its special engine of 42 by 48 inches with 75-ton fly wheel. Issuing from the intermediate train, the billet is brought to a hydraulic shear, which trims off the

may be the spectacle of seeing rails rolled in some of our great modern mills, we do not know of anything likely to prove as fascinating to rolling men as the direct rolling of $1\frac{1}{2}$ -inch billets from ingots. The credit for the work is due to the superintendent of the mill, Thomas Morrison.

The Carlin Three-Drum Hoisting Engine.

The engraving here presented represents a double-cylinder hoisting engine, provided with three patent friction drums, built by Thomas Carlin's Sons of Allegheny, Pa. The upper drum may be used, as in derrick work, for hoisting load, it having pawl and ratchet for sustaining the load at any point, with foot brakes for lowering; a cat head is keyed fast to the drum shaft and revolves as long as the engine is running, the drum revolving only when the friction lever is used. The two smaller drums shown in front of the hoisting drum may be used for swinging the derrick. The friction screws are operated by the two foot levers shown, thus allowing the engineer the free use of his hands in operating the hoisting drum and throttle valve. When used on sand or coal boats for the quick handling of material the cat head referred to is very handy in handling the boats. The boiler is a patent safety flue, and is placed on the same bed plate



THE CARLIN THREE-DRUM HOISTING ENGINE.

ends, and then passes forward to the finishing train, the engine driving it being a duplicate of that of the latter. Here it receives the second pass of what might be called the $1\frac{1}{2}$ -inch billet series, and falls upon transfer table No. 1, which brings it in line with the return pass No. 3 on the same finishing train, thence it is delivered in the usual way to pass No. 4 between the upper rolls in the intermediate train, on the other side of which transfer table No. 2 brings it into line with an end two-high train forming part of the intermediate train, and really being the lower rolls of that train. Now, again going through its fifth pass, it has the general direction of rolling and is conveyed to the sixth and last pass, through a two-high set forming a part of the finishing train. It travels on to the hot saws, and finally reaches the hot beds, which being a part of the equipment for rails are ample for all requirements. The majority of the small billets, which are rolled very clean and neat, to judge from the stock which we examined, are shipped in 30-foot lengths. However impressive

with the drums. The fire box is very well stay-bolted, has ring in the bottom and around the door, giving a large water space, and having numerous hand holes in the bottom and at crown sheet, allowing ample means for thorough cleaning; the fittings throughout are heavy, and made specially suitable for this kind of work.

Each engine is furnished with an iron tool box with a padlock, and contains wrenches, monkey wrench, hammer, chisel, oil can, and firing tools with suction hose, making a very complete machine.

The machine can be furnished with cylinders to meet the requirements of the work, either 6-inch diameter and 8-inch stroke, 7-inch diameter and 10-inch stroke, and 8-inch diameter, 10 or 12 inch stroke, as preferred.

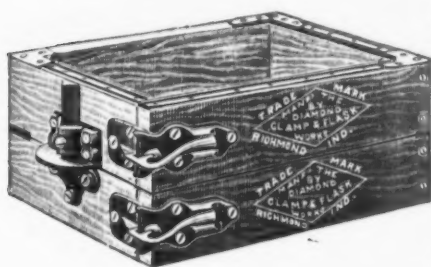
The 6-inch shells of the Sterling Steel Company of Pittsburgh were successfully tested at Indian Head, giving promise that the company will rank among the most important makers of armor-piercing projectiles in the United States.

Wooden Snap Flask.

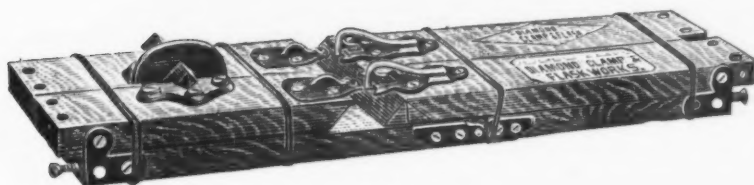
The accompanying cuts show a recently patented snap flask embodying several new features. The corner locks with a spring catch of simple design, and so arranged as to be durable and efficient. The spring is concealed, so that no sand or dirt can injure it. The pin is V-shaped and of extra length to suit the sets of five, which can be combined when necessary. Frequently it is necessary to build or make more depth to suit a different pattern, and to obviate this a set of any size is sold, comprising five drags 2, 3, 4, 5 and 6 inches deep and five copes the same sizes. They are arranged to make the following 25 different depths by interchanging:

Copes.. 2, 2, 2, 2, 3, 3, 3, 3, 4, 4, 4, 4,
Drags.. 6, 5, 4, 3, 2, 6, 5, 4, 3, 2, 6, 5, 4,
Copes.. 4, 4, 5, 5, 5, 5, 6, 6, 6, 6, 6,
Drags.. 3, 2, 6, 5, 4, 3, 2, 6, 5, 4, 3, 2.

These flasks are substantially made, with malleable-iron trimmings, corner irons, and are grooved in the sides to prevent the



Closed.



Open.

WOODEN SNAP FLASK.

mold slipping out. Additional information can be obtained from J. W. Paxson & Co. of Philadelphia.

Automobile Torpedoes.

By an exceedingly strange combination of circumstances this country has, until quite recently, been entirely without torpedoes of the automobile type, and, in fact, with the exception of one or two experimental weapons of the controllable type, there have been no torpedoes whatever to be relied upon for use away from the mine fields, in which, in time of war, it is proposed to sow submarine mines. The recent very successful experiments of the Howell torpedo secure us a weapon of American design, while the purchase of the Whitehead and the establishment of a factory for its manufacture in this country gives us another source of supply.

As these automobile torpedoes are a new feature in the armament of the cruisers, and as they seem destined to be a very important factor in naval engagements, a comparison between the two types can hardly fail to be of interest. Each weapon has its strong advocates, who advance many reasons to show that their particular favorite is the superior of all others, yet, while much that is said is fully borne out by experiments, the fact remains that no one weapon contains all the elements of perfection.

It is well to bear in mind the difference between the type of torpedo here mentioned and of the others one reads about in the accounts of progress in war material. The automobile projectiles, as their name indicates, take care of their own movements after they have been projected from the firing tubes aboard the vessels or firing stations. The controllable types are connected by wire with the firing station, and are at all times under the direction of an operator at the key-board. Although great improvements have been made recently in the latter class, they have not been viewed with as much favor afloat as the former. This is largely due to the fact of their being attended by the cables carrying the electric wires, which are considered a source of possible fouling to the propellers of the vessel from which they are despatched.

To-day there are three, and only three, successful types of automobile torpedo—the Howell, Whitehead and Schwartzkopf. The last two are almost the same, differing only in minor details of arrangement of mechanism; therefore the first two can be taken for comparison. They differ in almost every detail of mechanism and every arrangement. The cases carrying the explosive, propelling, diving and steering mechanism are in both weapons cigar or spindle shaped, weighing from 500 to 1200 pounds, of which total weight from 20 to 25 per cent. is in weight of explosive, all of which is carried in its forward part or head. The speed for the distance run varies from a rate of 20 knots per hour to one of 35 knots, according to the size, which naturally governs the driving power. The extreme effective range appears to be

about the same, regardless of size, and approaches 1000 yards.

The torpedo is ejected from the ship from a tube or gun which drops it into the water at about 30 or 40 feet from the vessel's side, or it is sent off under water from a tube below the water line. After taking the water the torpedo is sent throughout its course by screw propellers, and it contains mechanism by which it may be made to run at any desired depth below the surface from 3 to 20 feet. In its nose it carries a firing pin which, on contact with any resisting substance, explodes the charge of high explosive—in this country gun cotton is used. The whole torpedo is torn to pieces by the explosion. As it must be made to keep at a certain depth below the surface, mechanism must act upon a horizontal rudder to steer it to and maintain it at the depth required. There are two elements necessary to this: 1, a hydrostatic piston, and, 2, a pendulum. The face of the piston is free to receive the pressure of the water. Water presses on any objects, as is very well known, with a force equal to about 0.44 pound for each foot of depth and per square inch of area. If, for example, a piston face has 1 square inch of area, it will be pressed on by 4.4 pounds at 10 feet depth. Now, if behind this piston there be a spring of such a tension that when the pressure of 4.4 pounds is applied the piston is moved back 1 inch, then we may imagine a connection be-

tween the piston and the horizontal rudder of the torpedo, such that when the piston is 1 inch in the rudder will be horizontal, when completely out it will be "hard down" and when 2 inches in "hard up."

The result is plain: If the torpedo is at the surface of the water there is no pressure on the piston-face, it is out to its limit and the rudder is hard down, or in the proper position for sending the torpedo down. By the time it has reached a depth of 10 feet the piston has been forced in 1 inch and the rudder is amidships, or in a position to steer the torpedo in its axial line. If the torpedo goes deeper the piston is forced in further, the rudder is thrown up, and tends toward turning the torpedo up again to its "set depth," as it is called, which in the supposed case is 10 feet.

It may also be readily seen that by altering the tension of the spring behind the piston the depth at which the rudder comes amidships is altered. For we have assumed that when the piston is in 1 inch the rudder is amidships, and we made the tension of the spring 4.4 pounds, which we said would be the piston face pressure at 10 feet submersion. Now we could so arrange it that when the piston is 1 inch in, and the helm is amidships, the resistance of the spring will be only 2.2 pounds, or half what it was before, then the set depth would be 5 feet instead of 10 feet. So much depends upon this important steering function that the explanation has been entered into in detail, with the hopes of a clear understanding of its workings.

The piston and spring combination alone would not suffice, however, to properly steer the torpedo, as will be seen very quickly. Starting again at the surface, the rudder is hard down and the torpedo turns its nose readily enough in the direction of the bottom, but, just as in steering a boat, she must be checked in her angle of turn, or, as sailors express it, we must "meet her with the helm," so, as the torpedo starts to dive, it must be turned back to the horizontal by the time it reaches the proposed depth at which it is to run. Otherwise it will plunge below the depth and then, as the rudder gets hard up, will shoot above it, thus making a series of wild up and down shoots, wasting her speed and lessening, thereby, her effective radius.

Now, to control this unfortunate wobbling a pendulum of considerable weight has been introduced and hung so as to swing in the fore and aft line. Imagine the pendulum attached to the rudder like the piston, and in such a way that when the torpedo is horizontal it does not pull on the rudder, but when the head of the torpedo is down, swinging the pendulum forward, it pulls the rudder up, and *vice versa*. From this we can probably readily conclude that if the torpedo be horizontal and at its proper depth the helm or rudder is amidships, as it should be. If either above or below the set depth line and pointed away from that line, then piston and pendulum pull together to turn the rudder and steer the torpedo back. If above or below the set depth and pointed toward the proper depth line, piston and pendulum oppose each other so as to bring the torpedo easily and horizontally on her line.

There are complexities about the connections between pendulum, piston and rudder, as one must overcome the other under different circumstances of approaching the set depth, but in all automobile torpedoes the general principle is the same, not only with the steering mechanism, but in other important features. The general points of difference between the Howell and Whitehead are, first, as to the screw propellers. Both use double-screw propulsion, but the screws are differently arranged, on account of the differences in

methods of driving. In the Howell the arrangement is that of the common twin screws, while in the Whitehead the screws are in the same line, the one behind the other. The natural advantage lies with the Howell, since in the other the rear screw loses much of its driving effect from working in broken water in wake of the forward screw. This fault gives rise to two difficulties. An excess of power is required to gain a high speed, and as one screw drives with more effect than the other it creates a constant tendency in the torpedo to roll, and from this, since the horizontal rudder gets a vertical component, a sheer to one side or the other, causing it to deviate from the point aimed at. The twin screws of the Howell work in unbroken water, thus gaining their full effect, and as they work equally there is no tendency to sheer.

The direct motive power of the Whitehead is a flask of compressed air, which is worked through an engine in the same manner as steam. The motive power of the Howell is the force stored up in a heavy fly-wheel to which the screw propellers are geared directly. Therefore the Howell has no engine to add to its complications, while the other has. To offset this, the flask of air may be prepared a long time in advance, so that the torpedo is at all times ready for instantaneous discharge, while it requires a minute or more after inserting the torpedo in its tube to spin up the fly wheel of the Howell to the required number of turns.

With respect to the action of the fly wheel, however, the Howell has a great advantage in accuracy. This is due to what is called the directive force, or gyroscopic force. As examples of this power, an understanding of which may be at first difficult, take the common peg top. Almost every one remembers the boys' game of driving pennies with a top, it being flipped in the hand and thrown down in such a way that the peg of the top strikes the edge of a penny and drives it along the ground. With a single spin the top may be picked up and thrown down a half dozen times or more. Now, it will be remembered that as long as top is spinning well it stands vertical, although thrown at an angle at the penny. This is due to its directive force, or, in other words, the resistance of its axis to being altered in direction. In the Howell torpedo the axis of the wheel is across the torpedo; therefore when the wheel is spun at a high rate of revolution this axis resists all efforts to make it change its direction. In other words, it prevents the torpedo being deviated to the right or to the left. It may, however, turn up or down with perfect freedom, since this movement is simply one of revolution around the axis of the wheel.

The rudder action of the two torpedoes is quite different. In the Whitehead the rudder is pulled steadily up or down. In the Howell it is that of quick impulses. The latter is not so violent in action as the former and, therefore, is less liable to cause plunging deep, or, on the other hand, jumping out of the water.

In the Whitehead the pendulum and the piston are so connected that each directly influences the action of the other. In the Howell each one acts quite independently from and is not affected by the action of the other, while the resultant effect of both together is transmitted to and works the rudder.

Air pumps and their accessories are necessary on board ship to charge the air flasks of the Whitehead, but the work can be done at any time in anticipation of the moment of using the torpedo. Each launching tube of the Howell carries a small steam turbine to which steam is led directly from the ship's boilers. When the torpedo is placed in the tube a single movement of

a lever clutches the torpedo to it. When desired a throttle valve is opened, admitting steam to the turbine and spinning up the wheel. Whenever desired a single lever movement closes the throttle, unclutches, frees the torpedo and fires it. Both torpedoes are ejected by powder discharge, about 5 ounces of powder being used. In the Whitehead the charge is direct—that is, the full blast of the discharge is taken on the rear body of the torpedo. In the Howell the discharge is indirect, the powder being exploded in a side tube, compressing the air in it and driving it into the main tube.

The merits and defects of the two weapons seem to balance each other very closely, and in their present state of development only their actual use in battle could demonstrate which is the superior weapon. It is stated on good authority that the time may not be far distant when one or the other of the companies engaged in making the torpedoes will produce a weapon possessing all the good qualities of both.

Demurrage Rules.

The Southern Railway and Steamship Association have issued a circular embodying their demurrage rules, from which we quote:

All package freight which is not removed by the owners thereof from the custody of the railroad company within 48 hours, not including Sundays or legal holidays, computed from 10 o'clock a.m. of the day following the day of arrival, shall be subjected thereafter to a charge for storage for each day or fraction of a day that it may remain in the custody of the railroad company as follows: Shipments of less than carload quantities, 1 cent per 100 pounds per day, with no charge less than 10 cents per package. Shipments of carload quantities, 5 cents per ton of 2000 pounds per day, the right being reserved to store such property in public warehouses at the risk and expense of owners.

Bulk meats, bulk grain, hay, cotton seed, lumber, lime, coal, coke, sand, brick, stone, wood and other freights in bulk or otherwise as it may be a stipulation of the rates thereon or contracts for the transportation thereof, or where it is the custom for cars to be loaded and unloaded by the owners of the property, which is not unloaded from the cars containing it within 48 hours, not including Sundays or legal holidays, computed from 10 o'clock a.m. of the day following the day of arrival, shall be subjected thereafter to a charge for demurrage of \$1 for each day or fraction of a day that said car or cars remain loaded in the possession of the company, by whom to be delivered as the last carrier at interest; it being understood that said car or cars are to be placed and remain accessible to the consignee for the purpose of unloading during the period in which held free of demurrage, and that when the period of such demurrage charge commences they are to remain accessible to the consignee for unloading purposes. The fact of said storage or demurrage charges being assessable in conformity with these regulations may be stated by the delivering roads in their advice to consignees of the arrival of freight.

When loaded cars are placed for delivery, and remain in position enabling it, and owners failing to unload the freight therefrom within the time specified by these regulations, thereafter refuse to pay the demurrage accruing thereon, the railroads shall refuse to place other loaded car or cars for such consignees until they pay the accrued demurrage and obligate themselves to promptly pay all similar charges that properly accrue in the future.

Where cars that have reached their destination, as per bill of lading, are turned

over by the terminal road to a connecting road at the same place for the placing thereof upon its tracks or sidings, private or otherwise, to enable delivery, it shall be the duty of such connecting road to collect the demurrage charges herein established as per the advice of the amount due given it by the delivering line, and if delivery to the consignee is not immediately made, the said connecting road shall assess and collect demurrage in accordance with these rules; it being understood that the delivery from one road to another for the purpose named in this paragraph does not create a new period of free holding of the car or cars for either 48 hours or any part thereof, unless said transfer of the car has been made within the period of 48 hours free storage originally allotted, and then such portion thereof as remains unexpired will be allotted to the road to whom the transfer has been made for delivery purposes.

All loaded cars are understood and expected to receive transportation with due diligence and freedom from delay other than that exhibited in the current freight schedules or resulting from accidents liable to ordinary transportation over the railroads of the line or route covered by the bill of lading given or manifests made for the property. The holding of loaded cars at intermediate points in transit upon the request of shippers or consignees or of parties at said intermediate points is forbidden. Such stopping and holding can only be by order of Transportation Department at interest, or in compliance with law as may be required in due form (always excepting such stoppage as may be necessary to recover and properly move misdirected freight). Railroads of this association are therefore forbidden to assent to or permit loaded cars as described herein to be held at either of their termini or along their line.

A Pittsburgh contemporary has made a discovery which it classes as a peculiar phase in the iron trade. It refers to the awarding of a contract for an iron building by Wm. Cramp & Sons of Philadelphia to a company in Connecticut. The paper in question states (without authority, however) that the material to be used in this building will be made in Pittsburgh and transported to Connecticut, to be there fitted and then returned to Philadelphia. Where they got their information we are unable to say, but we understand from direct advice that this material is not purchased in Pittsburgh, but is to be furnished by Philadelphia parties. It need hardly be stated that the Connecticut company referred to is the Berlin Iron Bridge Company of East Berlin, Conn., who have for many years made a specialty of designing and building manufacturing plants and occupy in this line a very commanding position. The Berlin Company are and have been for a number of years putting up iron buildings in all parts of the country and have had large experience in this branch of work. Their plant at East Berlin is particularly designed for it, so that they occupy a leading position in the designing and building of manufacturing plants in iron. From a small beginning 12 years ago they are now doing a business of over \$1,000,000 per annum in this class of work, and while their apparent location might seem to call for excessive freight rates, yet the facts are that they are able to deliver their material to any part of the country quite as cheap as companies located in Pennsylvania.

The Chief of the New York Bureau of Boiler Inspectors reports making 6471 inspections during the year and 6381 tests of boilers, of which 40 were condemned. There were 6651 engineers examined during the year, and 5943 certificates were granted.

WORLD'S FAIR NOTES.

Financial.

Up to last week \$682,706 has been expended on the 12 buildings under construction by the exposition management. The Government Building and the Illinois State Building are, of course, not included. As the work advances the daily expenses become greater. It is estimated that \$600,000 a month will be disbursed from now on for some months, and more subsequently. The city authorities have been called on for \$3,000,000 of the \$5,000,000 to be appropriated for World's Fair purposes by Chicago, and it is desired at the rate of \$1,000,000 a month, beginning in February. The city Controller said last week that he thought he would experience little difficulty in selling the bonds. He said he was making arrangements to ask for proposals on the first \$1,000,000 worth by January 15.

"I shall endeavor to accommodate the World's Fair people," said he. "If they really need the money I will place the bonds on the market. There is nothing in the city finances which would lead me to hold back their sale, except that I wish to save interest on the bonds. I think, without doubt, that no difficulty will be experienced in disposing of the first \$1,000,000 worth by February 1. The bonds are gilt-edged, run for 30 years, and bear 4 per cent. interest. Their issue is authorized by a vote of the people of Illinois and capitalists will be glad to get hold of them. I have already had letters from prominent London and New York brokers making inquiries and asking when the bonds would be put on the market. So you see there need be no fear concerning their immediate purchase as soon as buyers are given an opportunity to get hold of them."

Thus far only \$23,000 has been paid on account of subscriptions by ocean steamship lines. It is generally expected that the Transatlantic steamship companies will carry a great many passengers during the summer of 1893 to and from the World's Fair. Last June all the steamship lines having agencies in Chicago were represented at a meeting which was presided over by E. St. John, chairman of the World's Fair Railway Finance Committee. The meeting was called for the purpose of stirring up the steamship lines, and by unanimous agreement the lines were assessed \$116,000, distributed on as equitable a basis as could be found. Of this assessment only one-fifth has been paid, and the five lines responding are the Hamburg-American Packet Company, White Star Line, French Mail Line, Allan State Line and the International Navigation Company, who operate the Inman Line. The Cunard Line, which does a large business, has thus far failed to do anything for the fair. The railroad lines centering in Chicago have subscribed \$800,000 for World's Fair stock, and it is thought that the steamship lines, which directly profit so much through these roads, should not hesitate to perform a plain duty in connection with the exposition. Ocean travel, it is conceded, will be vastly increased, and the steamship lines are expected to do their share toward the promotion of an enterprise from which they will reap great profits.

Progress Made in Construction.

The carpentry work on the Mines and Woman's buildings and the two freight sheds has been completed. The exterior scaffolding has been removed from the Woman's Building, and, barring the windows, it looks from the outside like a completed structure.

The pavilions of the Horticultural Building are up to the roof line. The

west curtain is being roofed and the windows for this curtain are being glazed. The dome is at a standstill for want of iron.

The clere-story trusses are being raised in the Transportation Building. The roof sheathing is done over the galleries and the skylight bars are being placed.

The skylight laying is three-fourths done on the Mines Building. The exterior covering is finished on the south end, except the main entrance. This portion of the building is being inclosed so the staff layers can work in cold weather. This method will be pursued on all the buildings where staff laying can be done during cold weather. A movable shed 5 or 6 feet deep will be erected against the wall of the building and heated with stoves.

The frame work of the Electricity Building is up to the gallery floor, and eight of the steel trusses for the roof are in place.

The structural work of the four pavilions of the Administration Building is complete, and exterior covering is progressing on all. The iron work is done up to the line of the base of the dome, a point 170 feet from the ground.

The floor for Machinery Hall is nearly finished, and the foundations for the annex are being put in.

The Agricultural Building is assuming shape rapidly. The work of placing the interior columns, gallery girders and gallery floor joists is nearly done. The iron columns which support the roof are being placed on the north end of the building.

The Manufactures Building now shows its first growth above the floor. Work on the north pavilion is progressing.

The Forestry Building is growing and will soon be occupied by the model makers. The north end of the building is nearly finished.

All the columns are up to the roof line of the Dairy Building, and the gallery floor is laid.

The iron frame work of the aquaria of the Fisheries Building is completed. The west pavilion is rising, and the main building is above the gallery floor. The brick walls of the Art Building are rising steadily. One hundred and eighty-five men are employed on the building and above 4,000,000 bricks have been laid.

Mexico at the Fair.

Mexico may or may not construct a special building. What the republic will do will depend largely, it appears, upon the report of Señor Miguel Serrano, the special World's Fair Commissioner appointed by the Mexican Government.

Señor Serrano arrived in Chicago last week to study World's Fair matters and learn exactly how big the exposition is going to be. Accompanied by the Mexican Consul at Chicago, Felipe Berrozabaz, Jr., he called on Director-Gen. Davis and Chief Fearn of the Department of Foreign Affairs and conferred with them relative to a Mexican exhibit.

Up to this time Mexico has appropriated but \$75,000 for an exhibit. Commissioner Serrano assured Director-Gen. Davis, however, that this amount was only a starter. He recalled the fact that at the recent Paris Exposition his country began with a small appropriation and gradually enlarged it. It put up a special building there, and exposition officials hope similar action will be taken at the Columbian Exposition. But whatever Mexico may do about a special building, no doubts should be entertained as to a large and thoroughly representative exhibit of Mexico at the fair.

Exhibits Already Arriving.

What to do with the exhibits intended for the exposition, which are already arriving, is a question which engaged the greater portion of the time of the Committee on Grounds and Buildings at its meet-

ing last Thursday. These exhibits are being sent to Director-General Davis, Chief of Construction Burnham, Traffic Manager Jaycox, and to the World's Columbian Exposition. Nobody, it appears, is anxious to look after them, and the committee referred the matter to the Board of Directors with the suggestion that some one be appointed to take charge of all exhibits upon their arrival and see that they are properly housed.

According to the recommendation of the Committee on Transportation this duty should devolve upon Traffic Manager Jaycox. Two buildings are being constructed in Jackson Park for the reception of exhibits. They are nearly completed, and in them will be housed everything arriving at an early day.

Special Trains for Eastern Workmen.

Letters have been sent, reading as follows, to Chauncey M. Depew, president of the New York Central and Hudson River Railway; George B. Roberts, president of the Pennsylvania, and Charles F. Mayer, president of the Baltimore and Ohio:

NEW YORK, December 28.

DEAR SIR: Will you please inform us upon what terms we can engage with you for a special mail and express train to carry 400 passengers, to run to Chicago and return once a week during each of the 26 weeks during which the Columbian Exhibition will be open in 1893? We hope that you will name a very low rate of transportation, for we wish to propose to the workmen of this city and vicinity to visit the great fair with their families, leaving New York at such time as to enable them to spend the whole of each Wednesday at the fair, and leaving Chicago at the close of the exhibition for that day. We make this inquiry thus early in order to give ourselves time to perfect a plan for a system of prizes and of wage-saving which we trust may assist many workmen to visit the Columbian Exhibition who would not be able to do so without such assistance.

Very truly yours,
THE MAIL AND EXPRESS.

Brevities.

Plans for Pennsylvania State World's Fair Building were approved by the Construction Department. Pennsylvania will erect an \$85,000 structure, one of the features of which will be a reproduction of the cupola of old Independence Hall.

Alexander Campbell, the special Exhibition Commissioner to Australia and New Zealand, writes that there is a surprising interest manifested in those countries in the exposition. The Province of New South Wales alone has asked for the large space of 200,000 square feet.

The Hawaiian Islands wish to be represented at the exposition, and Chief Fearn of the Department of Foreign Affairs received an application for 9000 square feet of space.

An engineering congress will be one of the features of the World's Fair at Chicago, at which it is expected that many European associations will be largely represented. Railway construction and operation, improvements in shipbuilding and the sewerage and drainage of cities, will be among the subjects to be discussed.

The Pennsylvania Railroad has authorized the building of 100 locomotives at its own shops, of which 50 have been already ordered, and will probably add 150 cars to its present equipment, besides making material additions at various points to third and fourth tracks. President Roberts said: "We generally have constructed from 75 to 100 locomotives a year. With our new shops at Altoona and the Western shops in good condition, I believe we will be able to make all our repairs and furnish our own locomotives." Expenditures on the Trenton cut-off will exceed \$3,000,000.

The Great Steamship Companies.

Now that the United States has begun to encourage the building and running of American steamships it may be interesting to know a few of the general facts concerning the over-sea navigation business of the whole world. To begin with it should be stated that there are actually in existence at the present no less than 161 maritime organizations whose business is the running of steamships over the great ocean thoroughfares of the universe. It must be remembered that this number, 161, excludes all small companies whose financial situation is of minor importance or whose operations are confined to short distances. The 161 companies are distributed among the principal nations of the globe in the following order:

England.....	64	Belgium.....	3
France.....	33	Australia.....	3
United States.....	15	Austria.....	2
Germany.....	12	Greece.....	2
Spain.....	7	Canada.....	2
Holland.....	5	Russia.....	1
Portugal.....	6	Denmark.....	1
Italy.....	3	Japan.....	1

A further arrangement or classification in the order of the importance of the ten most prominent lines whose aggregate tonnage of steamships exceeds 100,000 gross tons would be somewhat as follows:

	Steamers.	Tons.
1. Messageries Maritimes.....	63	202,801
2. Peninsular and Oriental.....	49	199,911
3. Norddeutscher Lloyd.....	70	189,723
4. Compagnie Générale Transatlantique.....	66	174,780
5. Florio Kubatoino.....	106	164,052
6. Anchor Line.....	44	127,065
7. Hamburg American.....	42	126,795
8. Ocean Steamship Company.....	44	109,000
9. Allan Line.....	31	107,346
10. Compañia Transatlantica, Barcelona.....	36	101,214

The above data is from an Italian computation, and readers of *The Iron Age* may recall that it is somewhat different from that published heretofore about the same subject and abstracted from the "Bureau Veritas," a French compendium of shipping, second only in importance and equal in authority to the great and mighty Lloyd's of England.

The *Bureau Veritas* gives as the first ten steamship companies of the world, arranged in the order of their aggregate gross tonnage, the following:

	Steamers.	Tons.
1. Norddeutscher Lloyd.....	66	221,603
2. British India.....	91	199,086
3. Messageries Maritimes.....	62	192,631
4. Peninsular and Oriental.....	48	187,654
5. Co. Générale Transatlantique.....	64	165,635
6. Florio Kubatoino.....	105	161,687
7. Wilson Line.....	84	147,162
8. Hamburg American.....	44	136,659
9. Allan Line.....	42	130,156
10. Austrian Lloyd.....	76	129,565

An ingenious method of inclined and horizontal log hauling has been introduced very successfully at the Hudson River paper pulp mills. The arrangement consists of an endless detached chain, running in a recess at the bottom of a trough, having special links with log teeth every 5 feet, and passing over sprocket wheels whose centers are 200 feet apart; the head wheel is 25 feet above the foot wheel, and the head end of the chain swings, and can be raised or lowered by means of a small winch to suit the depth of the water. The logs are floated to the haul-up, and, as they come around the foot wheel, are caught on the teeth of the chain and carried up the incline at the rate of 125 feet a minute. On arriving at the top they are discharged into a horizontal log haul, having head and foot wheels nearly 600 feet apart, the whole being similarly constructed to the inclined haul—the return chain supported by toothed idlers—and a deflecting piece is placed across the horizontal conveyer, by which the logs, elevated by the chain, are thrown out of the trough and rolled over the side upon long skids. By this arrangement the use

of eight or ten double teams and as many men is dispensed with. Some of the logs measure 30 inches in diameter and 50 feet in length, and a 25 horse-power engine is found ample for the purpose.

San Francisco News.

The matter of freight rates is likely during the coming year to possess an unusual importance for those in the hardware and metal trades, for the prices charged will not admit of any unusual rates on the part of carriers. Of course to this there are some exceptions. Manufacturers of nails, machinery, &c., would not object to prohibitory rates, as this would increase the field for them and decrease the competition, but this is a matter in which all must rise or fall together, the manufacturer as well as the rest. The Traffic Association is casting round to see what may be done, not that their managers are likely to adventure on any rash course, but they want to feel strong when they approach the consolidated roads, and want to have something to fall back on in case of refusal. The projects of a competing railroad and a competing steamship line have therefore both received favorable attention. It is proposed to build out from San Francisco toward Mojave, and the people of Fresno have already taken the matter up. As far as they are concerned, they will have a competing railroad and San Francisco can build up to them if she so pleases. Then Geo. W. Dickie of the Union Iron Works is out with the proposition to build a line of steamships to ply between this port and New York and Liverpool. They would be known as "The County Line," be five masted and 10,000 tons each. The first would be known as The County of Contra Costa; they would cost \$680,000 each. Their length over all would be 484 feet, their breadth 49 feet 6 inches, their depth to spar deck 41 feet. At \$10 per ton, or $\frac{1}{3}$ cent per pound, he calculates that they would earn enough to pay a profit of \$68,674 on the round trip. They would make said round trip, including the time spent in loading and unloading, in five months. They would, of course, be built at the Union Iron Works in this city, and as they would cost altogether close on \$7,000,000, their building would be an important event for the iron and steel ship-building industry of this city. Their freights—less than one-half of what is now charged—would be especially favorable to the hardware, iron and steel trades, as the freight bears more hardly on these than on most other lines.

Our hardwaremen are not yet out of trouble with the Government, as vessels from Europe with hardware, nails, &c., that started originally from New York continue to arrive. The ships Stockbridge and City of Benares have come to hand with large consignments and are in trouble. They have been refused entry, as their consignments came from New York via Antwerp, and it is considered that they infringed the law forbidding freight to be carried from one United States port to another in foreign bottoms. The consignees in this case are Carolan, Cory & Co., Hawley Bros. Hardware Company, Dunham, Carrigan & Co., J. B. Mooney and George W. Gibbs. This is another phase of the freight question, and as it now stands is simply a struggle between the railroads and the importers. The City of Benares had a large quantity of nails, wire, bar and plate iron and steel; the Stockbridge, steel and wire.

Prices have remained at a standstill except in the case of nails, which are still on the downward path, and where the list has been abandoned and two reductions made. Rates are now given without regard to quantity, for iron and steel, base \$2.50; wire, \$3. The nail

trade has been the reverse of satisfactory during the year, and with 1891 closes in a state of complete demoralization. The foundry business is recovering slowly from the blows inflicted by the strike, but this is the wrong time of year to expect much business. But for the shipyard and the Government work the iron trades manufacturing would have but a sorry report for 1891 to present. Most of the steel, the imports of which by rail have been very heavy, came to the Union Iron Works for the cruisers and the battle ship.

Imports of pig tin have of late been light, a couple of steamers arriving from Australia without any. However, the Monowai the other day had 299 ingots. The market is very dull at 21 cents. Tin plate is likewise dull at \$6.10 to arrive; \$6.50 spot.

New Minnesota Ore Fields.

A Duluth dispatch states that particulars of the new iron finds on the Mesaba range, in Township 58, ranges 16 to 18, are just beginning to come out and show that these latest ore discoveries exceed anything yet found in the entire Lake Superior region. The signing of the contract with Donald Grant for the building of the Duluth, Mesaba and Northern road has opened the mouths of the owners of some of the big mining properties on the new ranges. The projectors of the road are the owners of the Biwabik and Mountain Iron mines, Messrs. Merritt and A. S. Chase of Duluth, K. D. Chase and Donald Grant of Faribault, and others. The new mining territory lies from 8 to 20 miles west of the line of the Duluth and Iron Range Railroad at Mesaba.

Last August the work of development was begun. Thirteen test pits were sunk to the depth of 60 feet, and a distance of 1136 feet north and south and that much east and west show a solid vein of rich hematite ore.

The ore is a soft Bessemer, free from sulphur or silica, of dark color, and running 61 to 64½ per cent. pure iron. Specimens are shown that are so soft and free from hard substances that they can be whittled like soap. The vein is not vertical, like that of the Minnesota Mine, but horizontal. Owners of the property think they will find 20,000,000 tons just east of the Biwabik. The Cincinnati Iron Company secured lands a week ago and went to work and found the same vein, just as extensive as the Biwabik's, and adjoining the Cincinnati on the east. The same rich find has been made in the Hale Mine, west of the Biwabik; the Canton Mine of the Minnesota Iron Company has developed almost as great riches, and to the southwest, two sections, comprising the Williston, Chamley & Co.'s mine, another great body of the same quality of ore is found, and still another location west is showing up very rich.

From all accounts the mines being developed indicate very large quantities of iron ore. The discoveries insure the building of the Duluth, Mesaba and Northern Railroad from the mouth of the Artichoke River to the mines, a distance of 64 miles, and the contract calls for its completion by August 1 next. The Duluth and Iron Range road will also build a branch to the new mines this year.

The steel protective deck of the British warship Dreadnaught was bent inwardly 6 inches by heavy seas on her recent voyage from Malta. This accident, it is announced, will lead to a long and careful inquiry into the subject of protective decks, and may also be the cause of many modifications and improvements in the construction of those particular portions of the war ships now in course of construction.

THE WEEK.

Returns for the first three quarters of the year from Uruguay and the Argentine Republic show that trade in both has fallen off considerably since last year, notably in imports, showing the effects of enforced economy, after periods of reckless extravagance. The Montevideo customs returns, for instance, give the imports as only \$14,501,000, against previous year for the corresponding period \$25,121,000; and at Buenos Ayres the imports were but \$56,519,000, against \$115,903,000. The export figures for Uruguay are \$22,395,141, against \$24,178,510, and for the Argentine Republic \$80,126,000, against \$90,488,000.

The rage for tall buildings in cities where land is difficult to be had goes far to explain the increased demand for structural iron. Many of these buildings are practically a frame work of iron inclosed in brick or stone.

A Canadian lumber merchant, who writes to a paper in Montreal, says that Americans are purchasing the most valuable timber lands in the Dominion and exporting the product. The writer says that nearly the whole of the timber tributary to the streams entering into Georgian Bay and Lake Superior has passed into the control of Michigan mill owners, who now boast through their papers that they have secured 3,000,000,000 feet of our timber at prices ranging from 75 cents to \$2 per 1000 feet for stumpage, that would have cost them from \$5 to \$7 per 1000 at home—a clear loss to Canada in the start of fully \$10,000,000, but trifling as compared with the great loss to the country of the timber itself, the logs to be rafted over to Michigan and elsewhere, to stock their mills with the products of our forests and fill their markets with lumber that would otherwise be supplied by our own manufacturers; and Canada is to be deprived, for all time to come, of any further advantage from this portion of her timber property. The Government, therefore, is urged to restore the export duty on saw logs, which was reduced to \$2 per 1000 feet.

A company with \$3,000,000 capital has been organized in Illinois to manufacture American flax and proposes to build extensive factories in that State. Andrew Spear, Geo. F. Randall and Thomas Wilson are the incorporators.

Jay Gould's investments a few months ago were stated by an intimate friend to amount to \$125,000,000. The principal were in the Pacific railroads and the Western Union Telegraph Company.

Property owners in New York being opposed to underground rapid transit, it is probable the whole subject will be referred to a commission, and on their report the Supreme Court will decide what course will best promote public interests.

Speaking of the proposed enlargement of the St. Lawrence canals to equal the capacity of those at the Sault, the Dominion papers say that from a commercial and engineering point of view the course advanced is unquestionably right. The Government, however, has the financial view also to take into consideration, and it is a very great one.

The rainfall in the Croton water shed during the year was only 36.03 inches, or more than 18 per cent. below the average. Next summer New York City will receive an additional supply of 4,500,000 gallons by the completion of the Sodom Reservoir.

The New York City budget for the new year to be raised by taxation is \$33,881,000, which is a slight reduction. While the tax rate declines, expenditures increase.

The bridge improvement over the Harlem River at the New York Central Railroad's crossing has not been built, although ordered by the Secretary of War to be finished by January, 1892, for the relief of navigation. Other Harlem River bridges permit the passage of floats, barges and tugs with hinged smokestacks without opening the draws, but the Fourth avenue structure is so low that no kind of craft can pass under it. The difficulty is that the elevation of the tracks has not yet been authorized by the State Government.

The barrel factory of the Standard Oil Company at Constable Hook, N. J., was destroyed by fire, together with a magnificent Corliss engine and many thousand oak staves and finished barrels.

The last ice harvest in the Hudson River began December 15. This year prospects are discouraging.

Transportation by water, as remarked by one of the lake city papers, is the primitive means of conveying freight, and about the only known method of keeping down railroad rates. It can be easily shown by comparing General Poe's report on the traffic of the "Soo" Canal with the average freight rates on the railroads, as returned in "Poor's Manual" that the saving on the cost of transporting the freight which passed through the canal in 1889 was over \$46,000,000. The saving last year is estimated at over \$50,000,000. More than enough would be saved by the deep waterway in two years to pay for all the improvements contemplated.

The earnings of the great trunk lines of railroad show a general increase during the year, and afford a very fair index of the movement of merchandise throughout the country.

The growing wealth of the country, as well as the increase of manufacturing, is indicated by the importations of raw silk. As showing the large increase in the receipts of raw silk at this port during the first 11 months of 1891, against the corresponding period of 1890, we append the following figures, furnished by the Silk Association of America:

1891.....	41,890	Value.....	\$21,927,494
1890.....	29,732	Value.....	16,552,424

It is rather difficult to conjecture, in the face of the indifferent character and volume of the output of fabrics during the past year, where all of this enormous quantity of silk has gone. Importations from Yokohama alone during the last six months were 14,880 bales, against 6462 bales for the same time in 1890.

The Cherokees have consented to part with their title to the famous Cherokee Strip for \$8,595,736.12½.

A statistical review of the commerce of Buffalo for 1891, compared with the business for 55 years, makes a marvelous exhibit, showing an increase of nearly 4,000,000 bushels of grain, including flour, over the highest previous receipts on record. The magnificent total is 163,000,000 bushels. The figures also show a decided increase in the receipts of copper and in the exports of anthracite coal. Iron ore receipts show a decrease. The tonnage of the season compared with that of many years past shows some interesting changes. Take the two highest records:

	No. vessels.	Tonnage.
1891.....	10,879	8,928,963
1880.....	10,308	5,935,746

In 1880 nearly the same number of vessels entered and cleared in Buffalo as in 1891, but the tonnage this year was 3,000,000 tons greater than in 1880, owing to the introduction of big iron steamships.

Reciprocity arrangements have been signed at Washington by Secretary Blaine with the Ministers of Guatemala and Sal-

vador for their respective countries. The arrangements with Guatemala require the approval of the Congress of that country, but it is expected that the arrangement with Salvador will go into operation February 1 next.

A committee from the Minnesota Legislature are purchasing an outfit of twine manufacturing machinery in this city for the use of the convicts at the Minnesota State penitentiary.

On the application of a stockholder to see the books of an insurance company in this city, in order to learn the date of the next annual meeting, Judge Andrews of the Supreme Court decides that the books must be shown. Refusal in the case noted shows, in the opinion of the judge, that the respondent is unwilling that the relator should confer with other stockholders before the election.

Under the reciprocity agreement with Salvador, to take effect February 1, that republic will admit free of all customs plows and agricultural implements of all kinds, machinery, railroad materials, iron houses and iron plates for building purposes, iron kettles, furnaces, anchors, chains and printing presses.

A new trade channel is opened to Gibraltar direct by the North German Lloyd Steamship Company, who have two steamers on the line.

Returns of the census taken in December, 1890, of the population of the German empire (without Heligoland), give a total of 49,426,384, an increase in five years of 2,570,680; Prussia, 29,955,281; increase, 1,636,811.

A survey of the route for a submarine cable from Honolulu to California shows that a line is feasible.

A flouring mill to be operated entirely by electricity will soon be erected in St. Paul.

The business men of the Northwest have combined in a movement to secure lower freight rates on lumber, in order to secure for the Washington fir an entrance into the Eastern market.

West Superior, the rising city in Wisconsin, claims to have had a commerce during the year 1891 of over \$53,000,000, and that no other port, either North or South, can show such a percentage of growth.

The Russian famine appears to be assuming vast proportions, notwithstanding repeated denials from official sources.

Gen. M. C. Meigs, the noted engineer and Quartermaster-General of the United States military forces during the late war, died at his residence in Washington, 2d inst.

Six steamships have been chartered for January in the Reading's new Trident Line from Philadelphia to London, and the first steamer of the Atlantic Transport Line on the same route will sail in a few days. Philadelphia's foreign commerce promises well for 1892.

The Northern Pacific's great shops at Tacoma were opened January 1.

The British post office on January 1 adopted a uniform rate of one-half penny on all newspapers, books, printed papers, commercial papers, patterns and samples posted in the United Kingdom for places abroad.

The Brazilian Government has rescinded the law requiring foreign merchants shipping goods to Brazil to present invoices and bills of lading to Brazilian consulates for legislation.

Philadelphia's foreign trade for the past year shows a gain in tonnage employed, particularly in the last three months.

The Iron Age

New York, Thursday, January 7, 1892.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, - - - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

Last Year's Failures.

The two great authorities on commercial death statistics do not agree, so that those who desire to draw conclusions as to the future from the record of the past may fall back upon that series of figures which best suits their temperament. Bradstreet's records 12,394 failures with liabilities aggregating \$193,178,000 and actual assets of \$102,893,000, while R. G. Dun & Co. reach a grand total of 12,273 failures with \$189,868,638 liabilities. Placed side by side the two series of figures, so far as liabilities are concerned, are as follows:

Failures in the United States.

	Bradstreet's.		Dun's.	
	No.	Liabilities in 1000's.	No.	Liabilities in 1000's.
1891....	12,394	\$193,178	12,273	\$189,869
1890....	10,673	175,033	10,907	189,860
1889....	11,719	140,359	10,882	148,784
1888....	10,587	120,242	10,679	123,830
1887....	9,740	130,605	9,634	167,561
1886....	10,580	113,648	9,834	114,644

While Dun's report shows that the liabilities of the past year were practically the same as in 1890, Bradstreet's records a very striking increase. The two reports classify the failures territorially in a somewhat different way. In order to reach a comparison in detail we have changed the grouping of Dun's to that of Bradstreet's, with the following results:

Failure Statistics by Groups.

States.	Bradstreet's		Dun's.	
	Number.	Liabilities, 000's omitted.	Number.	Liabilities, 000's omitted.
Eastern.....	1,789	\$33,356	1,187	\$19,389
Middle.....	3,002	58,945	2,848	64,354
Southern.....	2,412	35,578	2,872	40,703
Western.....	2,602	42,576	2,478	31,940
Northwestern.	1,284	12,713	1,143	12,187
Pacific.....	1,182	8,973	1,198	7,884
Territories....	143	1,037	187	1,189

The most serious discrepancy, therefore, lies in the returns from the Eastern States, which Bradstreet's in 1890 reported \$27,111,148 of liabilities. Dun in that year made the figure \$27,774,624. On the face of the returns, according to Dun, there was a very encouraging decline in the commercial death rate from the figures given to \$19,389,878. Bradstreet's reflects a noteworthy increase from \$27,111,148 to \$33,356,000. An almost serious discrepancy is revealed in the Western group.

We do not pretend to be able to judge which figures are worthy of greater confi-

dence. The manner in which they are compiled is not given, nor are we quite sure that "liabilities" are terms of identical meaning in both cases. But the business community will do well to withhold its faith in both cases until evidence is forthcoming which justifies greater confidence in one of the two authorities.

Basic Steel for Bridges.

In the year 1887 the Austrian Minister of Commerce called upon the Austrian Society of Engineers and Architects to express an opinion on the question whether wrought iron or steel would be the better material for a bridge over the Danube at Fetesti. A committee appointed by that body pronounced in favor of iron, chiefly because little experience had been gathered in the country with the use of soft steel. At the meeting at which this report was presented a motion was carried calling for the appointment of a larger committee to study the general question of the use of steel for bridge structures. Some parts of the report of this committee have now been published, and are likely to lead to considerable controversy among steel makers on the Continent. The committee made 216 mechanical tests to determine the quality of wrought iron, of basic Bessemer and basic open hearth steel, and reached the conclusion that the latter excelled the others in resistance to mechanical attack and distortion. It was deemed expedient, however, to make tests on full-sized members, the type chosen being lattice girders 32 feet 10 inches long and 3 feet 11 inches deep. The total number of girders tested was ten, of which four were made of basic open-hearth steel, two were basic Bessemer and four were wrought iron. So far as the latter is concerned, it should be noted that some of it was Styrian iron, with a tensile strength of 58,000 to 61,000 pounds, and an elongation in 8 inches ranging between 20 and 28 per cent. The Bohemian iron used would come closer to what would be considered a fair quality in this country, having a tensile strength of 47,500 to 53,500 pounds and elongation of 8 to 10 per cent. The basic open-hearth metal was chemically good in quality, carbon being 0.101 per cent.; manganese, 0.34 per cent.; phosphorus, 0.048; sulphur, 0.035; silicon, 0.024, and copper, 0.08 per cent. It ranged in tensile strength from 55,000 to 66,000 pounds, 28 and 26.6 per cent. elongation corresponding respectively with the figures given. The basic Bessemer showed extremes of 50,000 pounds with 32 per cent. elongation and 59,000 pounds with 17 per cent. stretch.

In spite of the exceptional quality of the Styrian wrought iron, the committee decidedly gave the preference to basic open hearth steel. The most astonishing result, however, was the sharp condemnation of basic Bessemer steel. The two principal reasons given are that there is difficulty in producing uniform material and that the steel is sensitive to surface injury.

German manufacturers of basic Besse-

mer will probably take exception to such conclusions, which have been accepted by the Austrian producers as final, because they have abandoned all efforts to push the soft basic Bessemer metal for structural purposes. The German makers, on the contrary, have for years used basic Bessemer steel very largely in beams, shapes, plates, &c., and point to as elaborate a series of tests as those of the Austrian engineers as a justification of its use. It was only a few months since that Mehrten, a German railroad official, published a report on an elaborate series of experiments made to ascertain whether basic blown metal should be admitted as a material for bridges. The conclusion drawn from the tests, which included work on full sized plate girders, was distinctly in favor of the Bessemer basic, although Mehrten insists upon close watching and testing of every blow, because it is easier to avoid faulty charges in open-hearth practice than in Bessemer work. Probably the ultimate development of the contest now waging abroad, but rarely brought up in this country, will be that for dead soft steel basic open-hearth metal will be given the preference, while basic Bessemer will contest with acid steel for acceptance for ordinary mild metal.

It is an interesting fact that, so far as the German Government is concerned, the specifications for recent bridges allow the use of basic steel produced by either method. For the completion of the Fardon bridge, for 1893 delivery, two lots of steel structural material were called for. It so happened that one lot, of about 4500 tons, was secured by a concern which makes its own basic open hearth, while the second lot, of nearly 5500 tons, was taken by a bridge concern which buys its metal from a mill which uses the basic Bessemer process.

The Results of Reciprocity.

While it may be possible to exaggerate the expected benefits of reciprocity arrangements recently effected with foreign countries, some substantial increase in our foreign commerce may reasonably be expected, particularly with Cuba. In regard to South America her contributions in the aggregate, as a market for exports, amounted for the last fiscal year to less than 4.30 per cent. of the total to all countries, not equal even to those of the Dominion and Maritime Provinces on the north, respecting which we manifest comparative indifference. The Cuban duty on flour, which has been \$5.83 a barrel, is now less than \$1 a barrel. The duty on wheat, which has been \$1.65 a hundredweight, is now only 30 cents for 220 pounds, or a reduction from 99 cents to 8 cents a bushel of 60 pounds. The duty on flour imported into Porto Rico from the United States has been \$2.46 a barrel; now it will be less than \$1 a barrel, and the rate on wheat falls from 40 3/10 cents a hundredweight, or 24.18 cents a bushel, to 30 cents for 220 pounds, or 8 cents a bushel. During the year ended June 30, 1890, the total exports of wheat and flour from the United States to Cuba and Porto Rico

amounted to \$1,865,300, or about one-eighth of the entire exports from the United States to those islands.

Further arrangements have been concluded between the United States and Brazil, British Guiana and West Indies, Costa Rica, Germany, Guatemala, Salvador, San Domingo and Spain; and with negotiations pending, with promise of an early conclusion, between the United States and France and Mexico.

The arrangements with Salvador in detail have not yet been made public and those with Guatemala and Costa Rica await the approval of the Congress in each of those countries. Their revenue receipts being heavily mortgaged to meet the public debt, no important concessions could have been expected in either case.

In addition to the foregoing, within the past six months the markets of Austria-Hungary, Denmark, France, Germany and Italy, which had been shut against American pork for a long period, have been reopened, and from contracts already made promise is given of an enlarged foreign demand. The special desideratum is a more ample export market for manufactured products, which remains comparatively limited, affording little relief to the continued tendency to congestion in important lines of trade. Improvement in this respect bears no proper proportion to the increased traffic in products of the farm.

Prospects in China.

The latest accounts by mail from China—we have the *North China Herald* to December 7—show that while momentous events are pending in that country, nothing decisive has yet occurred that serves to determine the future. The central authority has been profuse in promises to send flying squadrons, &c., but has shown no ability to cope effectively with the violent outbreaks that have occurred in various directions. As the *North China Herald* says, no one knows whether the discontent in the country is deep enough to give the rebellion any chance of upsetting the Pekin dynasty. Still, the fact is recognized that the uprising is against the existing dynasty and that it is so formidable that the final issue is yet uncertain. Another ground of misgiving on the part of foreign residents is the questionable position of Li Hung Chang, who represents the central authority. Is his co-operation in subduing the rebellion guaranteed? He controls the modern army and navy and the available cash revenue of the Empire, but can absolute reliance be placed on his future movements? Li is recognized as the most progressive Chinese statesman, and as embodying the Western idea to the fullest extent yet attained among them as concerns modern civilization. But can he, himself a Tartar, stand against the rising sentiment hostile to foreign innovations and hostile to Tartar ascendancy? The *North China Herald* refers to recent lucubrations in prominent New York dailies as "superficial" and "highly misleading" in reference to Chinese affairs,

and the same view is taken by the New York official representative of the Shanghai and Hong Kong Banking Association, whose correspondence and opportunities favor the formation of correct opinion. For example, it has been erroneously stated that foreigners have no conventional rights beyond the 23 trade ports which the Government has thrown open to trade, whereupon the *North China Herald* remarks that besides the general protection provided for in all treaties, "It is specially stipulated in Article VI of the covenant of 1860 between France and China that it is permitted to foreign missionaries to rent and purchase land in all the provinces and to erect buildings thereon at pleasure," a permission which is extended by the most favored nation clause in all the treaties to all subjects and citizens of treaty powers.

In reference to the alleged hostility to foreigners, the same authority denies that any strong popular sentiment of this kind exists, but it is true that designing men sometimes succeed in inflaming the rabble, and overt acts are thus excited by men in superior positions. The local magistrates, when they are not disaffected, exert themselves to prevent insurrectionary movements. In Canton foreign residents claim to know little more than that the provincial authorities are taking off a certain number of heads, but to whom the heads belonged nobody can tell. The conviction is becoming more general that the mercantile community are in the presence of a grave crisis, and it may be long before the Imperial Government shall succeed in repressing the disturbances here and there, of which only fragmentary and often contradictory accounts are received.

PERSONAL.

The Committee on Science and the Arts of the Franklin Institute, Philadelphia, has awarded the John Scott legacy medal and premium to J. G. Speidel of Reading, Pa., for his invention of a portable hoist.

Percy R. Pyne of Moses Taylor & Co., who is largely interested in iron and steel enterprises, has gone to San Diego for his health, having lately suffered from a stroke of paralysis.

Edward Kelly, who has for several years been the chief subordinate at Port Oram of Tooke Straker, deceased, is now in charge of the Port Oram Furnace and the mines in Northern New Jersey controlled by Joseph Wharton.

R. H. Lee, superintendent of the Freedom Iron and Steel Works at Lewiston, Pa., was drowned on the 28th ult. by falling into Kiscoquillas Creek at Logan.

George H. Baker succeeds Angus Sinclair as editor of the *National Car and Locomotive Builder*.

A. Evans, Jr., who recently had charge of the Newberry Furnace, at Newberry, Mich., and the Detroit Furnace, at Detroit, has gone to Portland, Ore., to take charge of the blast furnace of the Oregon Iron and Steel Company, at Oswego, Ore., 7 miles from Portland.

In Waterbury, Conn., an engine which stands on a space of $\frac{1}{8}$ inch square and reaches a height of $\frac{1}{4}$ inch has been made. It has 148 parts, held together by 52 screws. The diameter of the cylinder is $\frac{1}{8}$ inch and the whole weighs 3 grains.

Washington News.

(From Our Regular Correspondent.)

The ability and amiability of the new chairman of the Committee on Ways and Means of the House are recognized features of the personality of the gentleman from Illinois, but they have never been associated with economic study or parliamentary leadership. His share in the approaching exhibit will therefore be a constant revelation to the country at large and especially to the great industries directly affected by the doings of this Committee on Ways and Means. As a whole the majority wing of the committee is tariff reform, or revision, as they chose to call it, according to the Mills programme, with Mills left out.

Chairman Springer is in reality a Western free trader, but he will be handicapped by the party campaign interests so far as any radical measures are concerned. Benton McMillin is a pupil of Mr. Mills and will labor in the direction of carrying out the old line of effort in tariff matters, but he will be held in check by the counterbalancing weight of the conflicting views of radical and conservative action entertained by his colleagues. The Republican minority will play no other part in the labors of the committee than to enter their opposition to everything the majority may propose to do. The general policy of the majority of the committee will be in favor of the introduction of a measure placing raw materials on the free list. This will include iron ore, coal, lumber and wool, &c. The scaling down of the duty on pig iron and some adjustment of rates on manufactured articles to this change will also be favored.

There is no intention in the face of the approaching national election to do anything very radical from the committee's standpoint, as it is claimed by certain Democratic leaders in the Senate that a moderate measure might have a prospect of passing that body. The margin of Republican majority is so small that the change of three votes would be sufficient.

Chairman Springer favors prompt action and no hearings of the interests attacked, on the ground that the whole range of subjects has been gone over.

The perfunctory organization for parliamentary ornamentation known as the Committee on Manufactures of the House has been very shrewdly composed of Congressional nobodies with the exception of two. This committee rarely meets more than two or three times in a session. It is mainly occupied in employing a clerk to do the epistolary and other drudgery at a per diem of \$6 or \$7 a day during the session. In order, however, that the manufacturing interests may know who the gentlemen of the committee are, it may be said that their names are: Henry Page of Rhode Island, Luther F. McKinney, New Hampshire; Matt D. Logan, Louisiana; John DeWitt Warner, New York; Jos. H. Berman, Mississippi; Sherman Hoar, Massachusetts; A. H. A. Williams, North Carolina; Michael D. Hurley, Ohio, Democrats. Ezra B. Taylor, Ohio; Elijah A. Morse, Massachusetts; John E. Reyburn, Pennsylvania, Republicans.

The tariff, although of direct concern to the manufacturers, being a matter of revenue, is absorbed by the Ways and Means Committee.

Every branch of the Navy and War Departments is actively engaged in getting the fighting arm of the Government in striking condition. Commodore Folger says: "We have the finest guns in the world, and a little practice in real war will doubtless open the eyes of the world. Fighting at sea is now a question of engines, guns and projectiles, and in my opinion we have the best."

During the week Chairman Springer devoted considerable attention to his tariff reform programme. This he now has in a state of forwardness which will enable him to make a move at once.

His first point of attack will be on wool, which he proposes to put on the free list. He will follow this up with free iron ore, free lumber, free coal, free salt, &c. There is no doubt about the passage of any of these measures in the House, and it might not be an impossibility to get them through the Senate. The margin of Republican majority is very small, a change of four votes being sufficient to turn the scale.

In the last Congress the three P's—Plumb, Paddock and Pierce—were not in favor of the protective policy and voted against it. In this Congress Plumb has gone to the other world and Pierce has been relegated to private life, but Peffer and Kyle are not counted safe on any proposition to put raw materials on the free list; this with Paddock makes three very unreliable on protection.

Commodore Folger, who has been at Bethlehem, has returned. He has given the necessary instructions to keep all work up to contract requirements and the high standard demanded by the Government for all its ships.

The date for the final test of armor plates at Indian Head has not yet been finally fixed.

OBITUARY.

FRANK HOPKIN THOMAS.

On December 29, F. H. Thomas, the furnace manager of the Franklin Iron Mfg. Company, died quite unexpectedly. His death was due to diabetes, from which he had suffered for some time before his last illness. He was known as one of the most skillful furnace managers in the country, and since he has had charge of the Franklin Works he has revolutionized the methods of producing and handling iron, as well as greatly enhancing the quality of iron produced. Since his illness the works have been in charge of his younger brother, Jno. W. Thomas. Mr. Thomas was born in Catasauqua, Pa., July 24, 1856. His early days having been spent in the immediate vicinity of the largest iron works of Catasauqua, then under the management of his father, W. R. Thomas, he naturally took a deep interest in the manufacture of iron, and it was not long before his close attention and strict application to his duties attracted the heads of these works, and young Thomas in a few years rapidly advanced and was placed in full charge of one of the leading blast furnaces of the South. After a short time better inducements brought him to Emaus, Pa., and Kensington, Pa., thence he removed to Franklin Iron Works, N. Y., about eight years ago. At the recent overhauling and extensive repairs made at the Franklin Works many of his inventions were applied, though he never lived to see the excellent results now being produced by them.

J. S. GRAFF.

Jno. S. Graff, for a number of years engaged in the scrap iron business in Pittsburgh, died at his home in Allegheny, on the morning of January 1. Mr. Graff was associated for a number of years with Jno. W. Heron in the above business. Prior to that time he was chief clerk for Zug & Co., Limited, proprietors of the Sable Iron and Nail Works of Pittsburgh, for 18 years. He leaves a wife and two children.

American Tin Plates.

The year that has just closed has been notable among other reasons in that it has seen the first steps taken to inaugurate an American tin-plate industry under the provisions of what is known as the McKinley bill. Consumers of tin plate have watched the progress of tin-plate making in this country with great interest. Those who have been badly served with foreign plate, those who have a desire for special qualities of plate which they have been unable to procure, and many others, have looked forward to the inauguration of tin-plate manufacture in this country with high hopes and pleasant anticipations. And yet comparatively little has been realized. But a good deal of foundation work has been done, a considerable amount of money has been expended, a few works are now in active operation, others are nearly ready to commence and still others are taking the first steps. *The Metal Worker* presents an account of American tin plates to date, mentioning the works and giving in brief some important particulars concerning them:

LIST OF TIN-PLATE WORKS IN OPERATION AND PROJECTED.

American Galvanizing Works, Cincinnati, Ohio.
American Tin Plate Company, Elwood, Ind.
American Tin and Terne Plate Company, 55 Laurel street, Philadelphia, Pa.
Anderson Tin Plate Company, Anderson, Ind.
Blairsville Rolling Mill and Tin Plate Company, Blairsville, Indiana County, Pa.
Britton Rolling Mill Company, Cleveland, Ohio.
Cincinnati Corrugating Company, Piqua, Ohio.
Cleveland Tin Plate Company, Cleveland, Ohio.
Columbia Tin Plate Company, Piqua, Ohio.
Coates & Co., Baltimore, Md.
Cincinnati Rolling Mill Company, Riverside, Cincinnati, Ohio.
Fleming & Hamilton, Pittsburgh, Pa.
Griffiths & Calwalledur, Pittsburgh, Pa.
Kieckhefer Bros. & Co., Milwaukee, Wis.
P. H. Laufman & Co., Limited, Apollo, Pa.
Lewis Steel Sheet and Tin Plate Company, Joliet, Ill.
Marshall Bros. & Co., Philadelphia, Pa.
New Philadelphia Iron and Steel Company, New Philadelphia, Ohio.
Norton Bros. & Co., Chicago, Ill.
Pioneer Tin Plate Company, Joliet, Ill.
Pittsburgh Tin Plate Works, Kensington, Pittsburgh, Pa.
Record Mfg. Company, Conneaut, Ohio.
St. Louis Stamping Company, St. Louis, Mo.
W. T. Simpson & Co., Cincinnati, Ohio.
Somers Bros., Third street and Third avenue, Brooklyn, N. Y.
Summers Bros. & Co., Struthers, Ohio.
N. & G. Taylor Company, Philadelphia, Pa.
Union Tin Plate Company, Allegheny, Pa.
U. S. Iron and Tin Plate Company, Demmler, Pa.
Wallace Banfield & Co., Irondale, Ohio.
Western Tin Plate Company, Joliet, Ill.

RATE OF PROGRESS.

Many of our readers and many of those who follow the daily papers for information concerning tin-plate making have been impatient at the comparatively slow progress which this industry has been making. They have felt that less was being done than should be done, and have

wondered why it was not pushed at a higher rate of speed, and why results have not been more speedily reached. Several things are to be offered upon this point. It is not the usual American fashion to do things here exactly as things are done abroad. With varying conditions of labor, with raw material in forms differing from the same material abroad, with a different scale of labor prices, and with other conditions varying from those where the industry is already in progress, it is only natural that experiments should first be made to adapt things to the best results. It is not strange, therefore, that American tin-plate manufacturers have hesitated before importing and putting into use exact equivalents of the appliances used in making tin plates abroad. Woman labor and child labor are features of the tin-plate industry in Wales, but the employment of women and children in industrial works in this country is something opposed to American notions. Manufacturers, therefore, have set about improving processes and adapting the conditions of the industry to American ideas. All this has taken time and has cost money, but as the result, the trade of tin-plate making is fast being learned, and the foundation of the industry is being laid in such a way that the results in the future will undoubtedly justify the slow progress of the past. A number of important inventions in processes have been made. Still others are partly completed, and when manufacturers get actively at work at the making of tin plates, as they will a short time hence, they will doubtless show a record in this industry quite as good as that of other industries which have been established in this country under similar conditions.

TIN-PLATE NOMENCLATURE.

Tin-plate manufacturers are still feeling their way with reference to sizes and gauges and nomenclature in general. A few concerns are turning out 14 x 20 and 20 x 28 plates of 1C and IX gauge, but greater thought is being given to the wants of consumers in matters of this kind than any one outside of a very small circle would suppose. No one seems inclined to erect works which shall be restricted to the sizes of plates heretofore current, making it impossible to produce larger sizes on occasion. All are disposed to so manage that they can turn out whatever a consumer may desire. All this means that the consumer has it in his power to say what grades and kinds and sizes as well as what quality of tin plates shall be made in this country. The year that is just opening will, no doubt, decide many of the questions which are yet open. Gauge designations have already been partially established upon a basis differing from that of British manufacturers. Other questions as they come up will undoubtedly have equally satisfactory solutions.

Philadelphia.

From Marshall Bros. & Co. of Philadelphia we have the following:

We start up in the first week in January with two tin mills, making about 50 tons, or 1000 boxes, per week. It is our intention to change our other mills as fast as possible, so that we can by the end of June next have eight tin mills, giving us a capacity of 200 tons, or some 4000 boxes, per week of tinned and terne plates. Our idea is to change our whole works into tin-plate works, which, in time, would give us a capacity greatly above that just mentioned. With this change made, our capital in the tin-plate business would represent some \$350,000.

Among recent tin-plate enterprises in Philadelphia is that of J. E. Straus & Co., who begin the manufacture of tin plates under the firm title of the American Tin and Terne Plate Company, with works at 55 and 57 Laurel street. We heard from Messrs. Straus & Co. that they expected to start manufacturing tin

andterne plate on the first of the year, and that their capacity would be about 400 boxes per week, which they will increase as occasion demands.

From a letter from N. & G. Taylor Company of Philadelphia we quote as follows:

We are running three stacks, two on roofing tin and one on bright tin. We have also on the ground the fixtures for the fourth stack. We will not erect this in the present location, as we have at last secured the property we have been after so long and will at once erect a factory. We have a most desirable location in the southern part of this city, the Pennsylvania Railroad passing at one end and the Baltimore and Ohio at the other. We have ample room and all facilities necessary for the business; we have our plans and will start on the work as quickly as possible. It is our intention to have room for 24 stacks, but will erect 12 at once; six will be for the making of roofing tin and will be the old fashioned open pots where the black sheets will be brought in contact with nothing but pure palm oil, tin and lead. The other stacks we will use in making the Taylor roofing tin, exactly the same quality as the Taylor old style, but not quite so heavily coated, but especial attention given to having it evenly distributed over the whole sheet. Taylor's Columbia, exactly the same quality and carrying a little less coating. The manufacture of bright tin plate will be carried on in another portion of the factory. We have had steel sheets from Pennsylvania of as fine quality as we ever saw imported, and to our minds there is no reason at all but what tin plate can be made in this country equal to any other produced.

Pittsburgh.

The Fleming & Hamilton Tin Plate Company, Pittsburgh, Pa., inform us that they have made some important improvements in the methods of tinning by the hand-dipping process, as a comparison of their present product with imported plates will show. They have had a good business during the year just closed and regard the prospects for 1892 as excellent.

P. H. Laufman Company, Limited, Apollo, Pa., manufacturers of sheet iron, &c., report about the same volume of trade for 1891 as for former years. Their sales were up to the full capacity of the works. During the year this concern put in a tinning apparatus and are now turning out sheets coated with lead and tin as demanded. They look forward to a prosperous year for 1892.

The Canonsburg Iron and Steel Company of Pittsburgh write us as follows:

At present we are not engaged in coating plates. We are, however, manufacturing black plates of the finest quality for stamping purposes, which are coated after stamping. We are increasing our capacity, but do not expect to take up the matter of coating in the near future. Our increased capacity is necessary to keep pace with our trade for black stamping plates. We may do something in regular sizes of commercial tin plate further on.

Strawbridge & Beaver, Pittsburgh, Pa., proprietors of the Pittsburgh Tin Plate Works, at Kensington, favor us with the following report concerning their enterprise:

Our preparation for making plates has progressed well, though, of course, we have met with the usual unexpected delays. We think, however, that we will be in operation the first week in January, 1892. Our capacity will be 1000 boxes (14 x 20 basis) per week, and we will turn out both bright plates andterne plates of the better grades. We expect to place an order between now and April 1 for two hot mills to roll down steel bars into sheets. At the start we will operate two stands of cold rolls, annealing furnace, pickling machinery and two improved Morewood tinning sets, shears, &c.

Record Mfg. Company.

The Record Mfg. Company, Conneaut, Ohio, write us as follows:

We have erected our tin-plate plant in connection with our present plant, in which we are large consumers of tin plate in the manufacture of our butter and lard packages, petroleum cans, varnish cans, &c. Our product will be largely for our own use, and as we require an extra fine coating for our butter packages, we will make what is known as Siemens-Martin Hammered Steel Plates. Our building is now

completed and the engine is set up. The machinery, which we have purchased from Daniel Edwards & Co. of Swansea, Wales, is now on the ground, and everything is being put in place as rapidly as possible, and we are in hopes to be able to commence operations in a very short time. The capacity of our plant will be about 2500 boxes per week, and the surplus over our own consumption will be sold in the open market. Our salesmen, who are kept on the road, have taken quite a number of orders for tin plate, which we expect to be in position to fill in a very short time. Our only delay is waiting for some machines which have not yet been delivered, although we have been informed that they are about completed.

The Anderson Tin Plate Company.

From the Anderson Tin Plate Company, Anderson, Ind., we have the following particulars concerning their new works:

We take pleasure in stating that we are at present making roofing tin and will soon be turning out bright charcoal tin. We have made only a little bright tin to see what we could do before building another stack. We have orders already for our roofing plates that will keep us busy until spring, and in the meantime we will build two more stacks for bright tin. We use the Morewood set, and as our workmen understand their business, we can equal any sample of tin orterne plate made anywhere. The present capital invested is only \$15,000 and our capacity is only 250 boxes per week. We expect to have two mills running next summer.

Brooklyn.

Somers Bros., Third avenue and Third street, Brooklyn, N. Y., widely known as manufacturers of decorated tin cans and boxes, have been active during the year just closed in building a new tin-plate works. These are unique in character, and to the details of their construction more care has perhaps been given than to any other similar plant in the country anywhere. Notwithstanding the attention that has been devoted to this department of the business, the firm inform us that their business in their regular lines has been larger than in any former year. They look forward to an excellent business in the year just opening.

Cleveland, Ohio.

The Cleveland Tin Plate Company, Cleveland, Ohio, wrote us late in December as follows:

We have been running about 30 days. We are having all we can do to fill orders, which are coming in rapidly.

The Britton Rolling Mill Company, Cleveland, Ohio, manufacturers of iron and steel plates, write us as follows:

As we have only been in operation a few months we cannot make comparisons with previous years. We are prepared, however, to say that competition is greater at present than when we were formerly in this business and that profits are less. We are busy erecting our tin-plate department, which will be a most important branch of our works and which if it proves successful will be the leading feature of our business. In the way of improvements in manufacturing, we would mention that a novel feature in our works is that the waste heat of our furnaces now furnishes the entire steam power for our plant. The appliances supplied by Westinghouse, Church & Kerr and others should receive credit for the above. The new year looks as though it would be a bright one for us and we expect good business in every department.

Blairsville Rolling Mill and Tin Plate Company.

From D. M. Fair, secretary of the Blairsville Rolling Mill and Tin Plate Company, Blairsville, Pa., we have a letter from which the following is an extract:

Our expected capacity is about 1200 to 1500 boxes of 14 x 20 plate per week. Our mill is now in course of construction and we expect to have it running in April. We shall have two hot mills, cold rolls, &c., two Morewood five-spot tinning machines, four other tinning machines. We have invested in the neighborhood of \$75,000. We shall turn out both bright andterne plates and expect to be in shape for supplying the different classes of plates for the building and manufacturing trades.

Cincinnati Corrugating Company.

The Cincinnati Corrugating Company, Piqua, Ohio, wrote us a short time since as follows:

We are now manufacturing roofing plate equal in every respect to any of the imported brands. We have our own rolling mills for turning out the black steel sheets and shall increase our tinning department just as rapidly as the trade may justify.

Wm. T. Simpson & Co.

From this firm we have a letter of recent date, from which we quote as follows:

We are now makingterne plates, 20 x 84 in size, and have a capacity of 50 boxes per day, and will increase this capacity if our trade warrants it.

United States Iron and Tin Plate Company.

Under recent date W. C. Cronmeyer, president of this company, wrote us as follows:

The building of our new mills is progressing, but it will be a month or six weeks before they are in operation. By February we expect to have four additional mills running and they will all be devoted to turning out black plate for tinning purposes. Our new tinning house will be completed about that time and then we expect to be able to turn out about 400 boxes of IC 14 x 20 black plates per day and will be able ourselves to tin about 300 boxes of that amount. We shall soon make additional extensions to our tin house in order to put the remaining 100 boxes per day into tin plate, but for the present the demand for black plate for tinning purposes is so great that we are inclined to supply some of our product to those people who have built tinning works and who have not yet put in machinery for rolling black plate. In the meantime we are going ahead in the small way that we have been during this year. The total amount that we expect to invest in this business will be about \$500,000. We intend to have everything as complete and substantial as it can possibly be made. We feel very much encouraged at the present outlook and think that the improvements that have been suggested in the manufacturing of this commodity will soon be the means of enabling us not only to turn out a high grade of plate, but also to keep prices within reasonable bounds.

We were obliged to abandon the use of natural gas and to experiment with various methods of utilizing different kinds of fuel. Several oil processes were tried, and we have succeeded in using oil as a fuel in the tinning department in a way to give excellent results.

Piqua, Ohio.

The Columbia Tin Plate Company, Piqua, Ohio, have nearly completed their building, which is a substantial structure of iron arranged for four Morewood sides. Two of the sets are already on the way, having been purchased from F. R. Phillips of Philadelphia, and the remaining two will be put in place just as soon as the first pair are successfully started. The company expect to make bright plates on one side andterne plates on the other, and have arranged with several large rolling mills in Pennsylvania to supply them with sheets for the present. As soon as the company can give a practical demonstration of successfully tinning the sheets and selling them at good prices, they intend to start a company with sufficient capital to erect and operate a sheet mill. They hope to get their works in operation by the middle of January.

Guns Required for the Navy.

The following table gives the number of guns required to arm the vessels now authorized, the number of sets of forgings ordered and delivered and the number of guns completed:

Caliber.	Number of guns required to arm vessels provided for by law.	Number of sets of forgings ordered.	Number of sets of forgings delivered.	Number of guns completed.
4-inch.....	60	25	35	7
5-inch.....	56	29	29	3
6-inch.....	129	134	134	117
8-inch.....	51	51	30	19
10-inch.....	12	25	14	8
12-inch.....	8	8	4	1
13-inch.....	12	12	0	0
Total.....	317	294	246	155

Smokeless Powder.

Secretary Tracy in his last report says that the most important advance made during the past year in respect to powder consists in the development of a smokeless powder, invented by Prof. C. E. Monroe of the Naval Torpedo Station. The results have exceeded the anticipations formed in reference to this powder. Its successful use has advanced by progressive experiments from 1, 3, and 6 pounder guns up to the 4-inch rapid-fire gun. In reference to the results accomplished, it is only necessary to say that with charges one-half the weight of those used with ordinary powders, the velocities have been increased nearly 200 foot-seconds, with no increase of chamber pressure. In other respects the powder gives singular satisfaction. It contains no volatile constituents, is not affected by repeated heating for long periods, is uninjured even by boiling in water, gives high and regular velocities with moderate and regular pressures, and thus far has shown all the essential requisites of a normal smokeless powder. It is safe to say that within a short time the use of ordinary gunpowder will be abandoned in calibers of 6 inches and below.

Nail Machinery for England.—An interesting transaction has just been closed by the shipment to Warrington, England, of nine wire nail machines by A. R. Whitney & Co. of this city. The machine in question is that known as the American Wire Nail and Tack Machine, one of which has been tested for nearly two years at the works of the purchaser of the consignment now gone forward. We understand that a number of other machines of foreign make were subjected to a prolonged trial at the same works, which are located in the heart of the English wire district, but the decision was finally reached to adopt the American machine. It may be of interest in this connection to state that the castings have just been made for the 557th machine of this design.

The construction of railroads in this country this year was less than in any year since 1885. The estimate of the *Railway Age* makes the construction a little more than 4100 miles, against 6080 miles in 1890, and 5730 miles in 1889, and 7120 miles in 1888. In 1887, the last and biggest year of railroad construction, 12,724 miles were built. Everything points to an increase in construction in 1892. The money market is in a condition which will encourage new ventures, and a number of leading lines have new mileage under projection in order to round up their systems. In the older and more densely populated sections of the country many short lines are likely to be constructed. Any work that is done will be necessary work, as the experience of the last four years has fully proved that while it may be easy to build an unnecessary railroad, it is very expensive to keep it running. The total mileage of the country is now more than 171,000 miles. The average yearly construction during the last decade was 6880 miles. The number of employees is believed to be about 870,000.

Phillips & Leyshon is the name of a new firm with office at 200 Walnut place, Philadelphia, who issue their circular under date of January 1. The firm announce that they have entered into the manufacture of Leyshon's Tinning Composition, specially prepared under W. T. Leyshon's supervision. The circular states that after an actual practical experience in the manufacture and use of this composition in coating tin plates, it is now offered to American tin-plate producers with the

confidence that it will meet their requirements. It is stated that with this composition tin orterne plates are coated quickly with an even coating free from spots, &c. The composition is said to be instantaneous in its action, harmless in itself and comfortable to workmen.

Tests of Lap-Welded Steam Pipes.

Andrew Laing, engineering director of the Fairfield Shipbuilding and Engineering Company, recently tested some lap-welded steam pipes made by A. & J. Stewart and Clydesdale of Glasgow.

A flange, about 2½ inches thick, was screwed on to each end of the pipe to be tested, a recess being cut in this flange, into which the pipe was fitted to form a thoroughly water-tight joint. To these flanges again there was fixed blind flanges with close pitched bolts. Into one of the blind flanges the pipe from the test pump was screwed and in the other blind flange a small hole was bored close to the top of the pipe, so that air could be discharged from the water in the pipe before the bursting pressure was applied, the hole being afterward closed up. One pipe of 11½ inches bore and 1½ inch thick burst under a pressure of 3100 pounds. Pipe 8 inches bore and ¾ inch thick burst at 2800 pounds. Test pieces cut from ordinary stock pipes were broken both when hot and cold; the results showed that there was no difference in strength between the hot and cold pipes. The difference in strength between the solid plate and the weld was found to be very small.

An interesting test was recently made to demonstrate the fire-proof qualities of the steel lath made by the Bostwick Steel Lath Company of Niles, Ohio, and New York. For the purpose of making the test, a wooden frame 2 feet 5 inches long, 1 foot 9 inches wide and 4 inches thick was covered on all sides with the steel lath and then with the usual three coats of plaster, thus representing a section of a partition wall. This section was placed in a furnace in the Potter Building, this city, and there subjected to a 35 minute test at a heat of 800°. When the plaster section was withdrawn it was found that the lath covering the wood frame remained perfect, and after same was cut away it disclosed the wood frame neither discolored or charred.

The following table shows the business of the Sault Ste. Marie Canal complete for the years stated:

	1889.	1890.	1891.
Total freights, tons	7,516,022	9,041,213	8,888,750
Passengers	25,712	24,856	26,166
Coal, tons	1,629,197	2,176,925	2,507,532
Flour, barrels	2,228,707	3,239,104	3,780,143
Wheat, bushels	16,231,854	16,217,370	38,816,670
Iron ore, tons	4,095,855	4,774,768	3,560,213
Lumber, 1000 feet	315,554	361,929	366,305
Copper, tons	33,456	43,729	56,190

The decrease in iron ore and gain in coal and wheat will be noted. Superior has handled over half of the grain and flour, 40 per cent. of the coal, 25 per cent. of the copper ore, over 30 per cent. of the freight tonnage, 50 per cent. of the valued freights passing the canal in 1891.

The first shipment of Alabama pig iron via Mobile arrived at that port 28th ult. The consignment is to Naylor & Co., New York City, and consists of 160 tons. This is the first shipment of quite a large amount to the same parties under contract. The iron came from Birmingham via the Mobile and Ohio road at a rate of \$2 per ton, and will go thence to New York per steamship Elihu Thompson at \$2 per ton, or \$4 freight in all. In the matter of time this route is shorter than by the average all-rail route.

Trade Publications.

THE STOW FLEXIBLE SHAFT COMPANY, Limited, of Philadelphia have just issued a new catalogue describing their flexible shaft and mentioning some of the many uses to which it may be applied. As our readers well know, this shaft transmits rotary motion to any desired distance from the power source, through any number of curves, thus allowing the power to be carried to the work instead of the work to the power. The construction of the Stow Flexible Shaft is peculiar to itself, and it is in this peculiar construction that its utility consists. It is made up of a series of coils of steel wire, wound hard upon each other, each alternate layer running in an opposite direction, and the number of wires in different layers varying according to the work the shaft is adapted to; on being brought to size, about 1 inch at each end of the shaft is brazed solid, and to these solid ends the fittings are attached, the one to receive the tools to be operated, the other to receive the power from the pulley inclosing it, which in turn receives its power from a belt. Next, a case is prepared consisting of a single coil of special square steel wire, its internal diameter being a loose fit for the outside of shaft; this is covered with some flexible material, leather preferably, over which at either end a ferrule is fastened; into this ferrule at one end is screwed the hand piece, at the opposite end the frame which carries the pulley. The new shops of this company are well arranged for the work produced in them and are fully equipped. On the first floor are the shipping department, store room and shop containing heavy machinery. The smith shop is placed in a detached building in the yard. The second floor is devoted to the main offices, pattern loft and shop containing lighter tools. The third floor is the drafting room. Work is conveyed to the several floors by a hydraulic platform elevator of 6000 pounds capacity. The building is heated throughout by either live or exhaust steam. All the floors are exceptionally well lighted.

WE HAVE RECEIVED an illustrated circular from W. & G. W. Love of 141 Elm street, New York, describing the J. J. Love patent piston packing. The springs in this packing are self-adjusting and exert an equal pressure in every direction, thereby keeping an equal pressure of the packing rings on the cylinder for the full length of the stroke of the engine. This insures the parallel and true wearing of the cylinder.

A new census has been taken of the population of the maritime provinces, Nova Scotia, New Brunswick and Prince Edward Island. Taking the three provinces together the population increased 13.5 per cent. in 1881 as compared with 1871, and barely 1.2 per cent. in 1891 as compared with 1881.

Dr. Leo recommends the use of magnesia brick for blast furnace lining. No. 2 Romback Furnace, Lorraine, was so lined in June, 1890 and after 17 months' run has done well, while one of the Kladno furnaces, in Bohemia, has shown good service after two years' blowing.

Tooke Straker, for many years manager of the interests of Joseph Wharton, in New Jersey, is dead. He was also in charge of the Wharton Furnace at Port Oram, N. J.

In his annual report Governor Murphy of Arizona has the following about the red sandstone of that territory: "The sandstone quarries of Coconino County, near Flagstaff, are furnishing large quantities of first-class building stone to both Eastern and Western markets. The gray and red sandstone of Arizona quarries is exciting the attention of builders wherever it is introduced on account of its superior quality, resistance of heat, &c. The supply is practically limitless, and notwithstanding the distance from populous markets, the quarrying and shipment of this stone has become a growing and profitable industry."

MANUFACTURING.

Iron and Steel.

The Midvale Steel Company of Nicetown, Philadelphia, make the announcement that they have transferred their steel casting department to the new steel-casting plant which has been in course of erection for over a year. The capacity of the plant will be 100 tons of steel castings per day, and when it is in operation they will be in position to make single castings weighing not less than 100 pounds and not over 45 tons.

The Diamond State Iron Company's plant at Wilmington, Del., has again been visited by fire, this time the South Side Foundry, a structure 160 x 75 feet, being partly destroyed.

Rapid progress is being made toward completing the new Philadelphia Furnace of the Florence Cotton and Iron Company, at Florence, Ala., and it is reported that operations will begin January 15.

The rolling-mill, furnaces and franchises of the Hollidaysburg and Gap Iron Company at Hollidaysburg, Pa., have been sold by the receiver to the Hon. A. S. Landis, trustee for the first mortgage creditors, for \$25,555.

The works of the Carpenter Steel Company, recently partly destroyed by fire at Reading, Pa., will be entirely rebuilt at once with a view to making the new plant one of the most complete in the country. It is now stated that the insurance of \$125,000 will cover the loss by fire, as the machinery was found to be not materially damaged. The machine shop is now running, and temporary structures will be erected in order that some Government contracts may be completed. The new plant will be much more extensive than the old works.

The cotton tie and rolling mill of the Denison Rolling Mill Company, at Denison, Texas, is nearing completion and will shortly be in operation.

The contract for the masonry work of the new plant of the South Boston Iron Works, to be erected at Middlesborough, Ky., has been let and the work will now proceed uninterruptedly until the plant is completed.

The Cumberland Nail and Iron Works, at Bridgeton, N. J., have resumed operations in full after several weeks' idleness.

The steel casting weighing 17,500 pounds made by the Standard Steel Casting Company of Chester, Pa., for Carnegie, Phipps & Co., and which was lost from the car while being conveyed to its destination, has been found in the Susquehanna River, near Columbia.

Scioto Furnace, in Scioto County, has blown out, and Crawford & Leonard, its operators, announce that the furnace will probably never run again.

The Norristown Furnace of Isaac McHose & Sons, Norristown, Pa., resumed operations on the 28th ult., after being banked for two weeks to make general repairs.

No. 2 Rockhill Furnace, at Orbisonia, Pa., was started on the 21st ult., after being banked for 20 months.

One of the five furnaces of the Lackawanna Iron and Steel Company, at Scranton, Pa., which blew out November 10, is still undergoing repairs.

Center Furnace, Kelley & Franklin, lessees, Ironton, Ohio, has blown out for the winter.

Mount Vernon Furnace of the Campbell Iron Company, in Lawrence County, Ohio, has blown out to put in a new hearth.

The partnership heretofore existing between Jno. Stuart Brown, Henry Graham Brown, and James Neale of Pittsburgh, under the firm name of Brown & Co., proprietors of the Wayne Iron and Steel Company, was dissolved on the 31st day of December, 1891, by mutual consent. The firm has been succeeded by the new firm of Brown & Co., Incorporated, who will continue the business as heretofore.

The Passaic Rolling Mill Company of Paterson, N. J., are putting in a manipulator in connection with their blooming mill, having adopted the same design which is in use at the works of the Phoenix Iron Company at Phoenixville, Pa.

The failure of Graff, Bennett & Co. of Pittsburgh, proprietors of the Milvale Rolling Mill Company and the Clinton Iron Works, both located in Pittsburgh, which occurred some years since, has been recalled by a suit entered in Steubenville, Ohio. Charles H. Spaulding and L. J. C. Drennen, administrators of the estate of the late David Spaulding, the pioneer iron manufacturer of the Ohio Valley, brought suit against the National Exchange Bank to compel a reassignment of interests in the trusts of Graff, Bennett & Co. by the Spaulding Iron Company. These interests had been transferred to the bank as

collateral security on a loan of \$12,500 made by Mr. Spaulding for the iron company. This loan has since been paid in full. When Graff, Bennett & Co. failed the Spaulding Iron Company of Brilliant, Ohio, were heavy creditors, and pooling their issues with a number of other creditors representing over \$300,000, bought the Graff-Bennett mills. Smaller creditors have since been paid off and the Spaulding Company hold a mortgage for \$400,000 against the mill. The Spaulding Company failed in 1889. The company borrowed from the bank and Mr. Spaulding endorsed notes for the company, leaving the \$12,500 of the Graff-Bennett trust stock as collateral. Before his death he had paid off these notes and his administrators hold that his estate is entitled to the collateral. John McFeeley, receiver of the iron company, is made a party defendant to join with the plaintiffs in the suit.

The Tyler Tube and Pipe Company of Washington, Pa., manufacturers of boiler tubes, manufacture all their own iron and are about to add another train of rolls to their rolling mill, which will double their present capacity.

The wages of the employees of the Homestead Steel Works of Carnegie, Phipps & Co., Limited, at Homestead, Pa., for the three months commencing January 1, 1892, will be paid on the same basis as for the three months ending on December 31, 1891. The selling price of billets for the last three months of 1891 was somewhat less than \$25, but according to the agreement existing between the firm and the men wages cannot be based on less than \$25 per ton as the selling price for 4 inch by 4 inch billets.

Machinery.

The Youngstown Mfg. Car Company of Haselton, Ohio, are building a new foundry. The building will be 100 x 60 feet, and the equipment will be modern in every particular.

During the recent conflagration at Nashville, Tenn., the plant of the Waters-Allen Foundry Company was destroyed. The loss is put at \$40,000.

The Manhattan Type Foundry of Fort Lee, N. J., has been incorporated, with a capital of \$50,000, to manufacture type, printing presses, machinery, &c.

A new machine shop, 130 x 57 feet, will be added to the works of the New Castle Wire Nail Company at New Castle, Pa. With the completion of this structure and the new addition to the wire-drawing department, 140 x 30 feet, and a new engine house, 85 x 45 feet, both now completed, the amount of surface covered by new structure at these works will be 15,575 square feet.

The machine shops of the New York, Susquehanna and Western Railroad at Wortendyke, N. J., have been destroyed by fire, at a loss of \$20,000.

Murray & Porter will establish machine shops at Jefferson, Texas.

The Pittsburgh Locomotive Works, whose plant is located in Allegheny, Pa., have prepared plans for an extensive addition to their works. Work on this addition will probably not be commenced for several months yet.

The partnership heretofore existing between Chaplin, Fulton & Co., Pittsburgh, and the Bingham Gauge Cock Company, Limited, of Pittsburgh, was dissolved on December 31, 1891. The above firms have been succeeded by a new firm, to be known as the Chaplin Fulton Mfg. Company, Pittsburgh, Pa. They will carry on the business of both concerns as heretofore.

Hardware.

The S. Obermayer Foundry Supply Mfg. Company, Cincinnati, Ohio, were damaged by fire a few days since to the extent of \$500. The fire started in a frame building which the company use for the purpose of crushing coal into a fine powder, but was discovered in time to prevent a disastrous conflagration.

Carter Company, Capouse Works, Scranton, Pa., have adapted methods used years ago in making Carter's Hand-Made Black Diamond Axes. We are advised that these axes are forged entirely, using neither drop press nor punch, and that in tempering each axe is treated individually. Owing to the method of forging they are able to obtain remarkable results in toughness and lasting cutting edge. The sales of this brand of axe during the present season of low prices convince the manufacturers that where it is known it is a favorite with choppers. This firm has been engaged in the manufacture of axes for half a century.

Miscellaneous.

A car-wheel manufacturing enterprise is projected for Omaha, Neb.

The Westinghouse Company of Pittsburgh have issued a circular to railroad companies announcing a reduction from \$45 to \$40 per set for automatic air brakes for freight cars. The

company have been enabled to make this reduction owing to the cheapening of production brought about by the introduction of improved machinery and by their increased facilities.

The Booth Knife Works, at Stockholm, N. J., have received a contract from the Government to furnish all the knives of any sort required in the United States Navy for several years to come.

The recent orders and shipments of the Jeffrey Mfg. Company of Columbus, Ohio, are as follows: Robbin's Coal Mining Company, Pittsburgh, 1 mining machine, 1 power drill; Sunday Creek Coal Company, Columbus, Ohio, 3 mining machines, 2 power drills (second order); Gaslee & Lockwood, Evansville, Ind., 1 power drill; Hocking Valley Coal Company, Nelsonville, Ohio (Wm. Job, president, formerly general manager of the Morris Coal Company), 5 mining machines, 3 power drills; Union Colliery Company, Victoria, B. C., 1 electric mine pump; Egyptian Mining Company, Du Quoin, Ill., 2 power drills; Harris Coal Company, Jobs, Ohio, additional order, 1 mining machine; Cambria Mining Company, Cambria, Wyo., 5 power drills; Monongah Coal Coke Company, Monongah, W. Va., additional order, 1 mining machine; New Pittsburgh Coal Company, Nelsonville, Ohio, additional order, 1 power drill; Glen Mary Coal Company, Glen Mary, Tenn., 3 power drills; Upson Coal Company, Shawnee, Ohio, additional order, 1 mining machine; H. D. Turney & Co., Columbus Ohio, complete electric plant, consisting of engines, boilers, electric machinery, including the Jeffrey mining machines. Coal handling machinery and elevators and conveyors for the following companies: Mt. Carbon Company, Mt. Carbon, W. Va.; North Bend Coke Company, North Bend, Ohio; Union Pacific Railway Company, Rock Springs, Wyo.; St. Louis and Big Muddy Coal Company, Cartersville, Ill.; Louder Wooley Coal Company, Evansville, Ind.; Lubrig Coal Washing Company, Mt. Carbon, Ill.; Mud River Coal Coke Company, Mud River, Ky.; Texas and Pacific Coal Company, Thurber, Texas; New Pittsburgh Coal Company, Farmersburg, Ind.; St. Louis Ore and Steel Company, Murphysboro, Ill.; Crystal Plate Glass Company, St. Louis, Mo.

The Secretary of State of Illinois has recently issued incorporation licenses as follows: Chicago Power Supply and Smoke Abating Company, at Chicago; to supply compressed air for power; capital stock, \$10,000,000; incorporators, J. P. Bacon, Chester M. Dawes and John H. Hume. The Lanyon Zinc, Oxide and Paint Company, at Waukegan; to manufacture oxides and paints; capital stock, \$50,000; incorporators, Arnott Stubblefield, John E. Grooves and Sherley Schooler. The Chicago Steel Casting Company, Chicago, to manufacture steel castings; capital stock, \$50,000; incorporators, W. K. Shelly, S. P. Shelly and L. J. Shelly. The Excelsior Heating Company, Chicago; capital stock, \$35,000; incorporators, H. W. Wilker, M. J. Sheridan and C. E. Ferreira. Chicago Cordage Company, at Chicago; to manufacture twine and cordage; capital stock, \$600,000; incorporators, Edward G. Mason, Charles H. Townsend, Wm. C. Arnold. Hecla Mfg. Company, at Chicago; to manufacture hardware, tools, &c.; capital stock, \$150,000; incorporators, Fred A. Rowe, Frank G. Gardner, Solomon Victor. Landis Steel Curbing Company, at Chicago; to manufacture street curbing, sidewalks, &c.; capital stock, \$75,000; incorporators, Loyal L. Smith, F. L. Brooks and John J. Rooney. The Enamel Insulator Company, at Chicago; to manufacture electric heating devices; capital stock, \$500,000; incorporators, H. B. Ford, Robert W. Vasey and Thomas E. Marford.

A new company, known as the American Radiator Company, has been organized, with a capital of \$3,500,000, and has purchased the plants, business and good will of the Michigan Radiator and Iron Mfg. Company, Detroit, the Detroit Steam Radiator Company, Detroit, and the Pierce Steam Heating Company, Buffalo, N. Y. The general offices of the new concern are located in Chicago at 11 and 13 Lake street, and were opened January 1 with the following officers: President, Joseph Bond; first vice-president, John B. Dyar; second vice-president, John B. Pierce; secretary, Clarence M. Wooley; treasurer, C. H. Hodge; purchasing agent, Clarence Carpenter. A Chicago syndicate of real estate dealers has offered the new corporation \$50,000 to move the plants of the Michigan Radiator Company to Chicago. The works in question employ 600 men.

The City of Lima, Ohio, has bonded itself for \$150,000 to be expended in inducing new industries to locate there.

The following circular, signed by Charles Francis Adams, August Belmont, Brayton Ives, Charles Fairchild and George Westinghouse, Jr., has been sent out: "The voting

trust of the Westinghouse Electric and Mfg. Company, created by the voting trust agreement, dated July 1, 1889, has been terminated. Certificates issued by the undersigned or George Westinghouse, Jr., Jno. Caldwell, Robert Pittcairn, Hugh R. Gardes and George W. Hebard, or any of the trustees acting under said agreement, can be exchanged at the office of the treasurer of the company, 120 Broadway, New York City, for the stock certificate of the company for the same amount and kind of stock as the certificates surrendered."

The Eureka Transportation Company will shortly establish a plant at Kansas City, Mo. The company have a capital stock of \$2,000,000 and have car manufacturing facilities at Litchfield, Ill., Lafayette and Indianapolis, Ind.

The United States Fire Escape Company, Lewis Block, Pittsburgh, Pa., whose works are located at Washington, Pa., have several large contracts on hand for the erection of fire escapes. Among the buildings to be equipped with the fire escapes made by this firm are the Pusey & Kerr Building, Allegheny, Pa., Kromer Hotel, Scottsdale, Pa., and Turner Hall at McKeesport, Pa. The works of the firm are now being enlarged in order to accommodate their increasing business.

Our Mineral Product.

The United States Geological Survey has just issued its usual annual sheet showing the mineral product of this country. The following are the figures for the year 1890:

Products.		
Metallic:	Quantity.	Value.
Pig iron, spot value, long tons.....	9,202,763	\$151,200,410
Silver, coining value, troy ounces.....	54,500,000	70,464,645
Gold, coining value, troy ounces.....	1,588,880	32,845,000
Copper, value at N. Y. City, pounds.....	205,115,133	30,848,797
Lead, value at N. Y. City, short tons.....	161,754	14,260,703
Zinc, value at N. Y. City, short tons.....	63,683	6,266,407
Quicksilver, value at San Francisco, flasks.....	22,926	1,203,615
Nickel, value at Philadelphia, pounds.....	223,488	134,093
Aluminum, value at Philadelphia, short tons.....	61,281	61,281
Antimony, value at San Francisco, short tons.....	129	40,756
Platinum, value (crude) at N. Y. City, troy ounces.....	600	2,500
Total value of metallic products.....		\$307,334,207
Non-metallic (spot values):		
Bituminous coal, long tons.....	99,392,871	110,420,801
Pennsylvania anthracite, long tons.....	41,489,858	61,445,083
Building stone.....	54,000,000	
Lime, barrels.....	60,000,000	28,000,000
Petroleum, barrels.....	45,000,000	35,000,000
Natural gas.....	20,000,000	
Cement, barrels.....	8,000,000	6,000,000
Salt, barrels.....	8,683,943	4,707,869
Limestone for iron flux, long tons.....	5,521,622	2,760,811
Phosphate rock, long tons.....	510,499	9,213,795
Zinc white, short tons.....	1,600,000	
Mineral waters, gallons sold.....	11,321,878	2,338,140
Borax, pounds.....	9,500,000	617,500
Gypsum, short tons.....	182,995	574,523
Manganese ore, long tons.....	25,000	250,000
Mineral paints, long tons.....	45,732	661,992
Marls, short tons.....	150,000	65,000
Pyrites, long tons.....	111,836	273,745
Flint, long tons.....	13,000	57,400
Mica, pounds.....		32,569
Corundum, short tons.....	1,970	89,395
Sulphur, short tons.....		118,833
Precious stones.....		
Gold quartz, souvenirs, jewelry, &c.....		
Crude barytes, long tons.....	21,911	86,505
Bromine, pounds.....	387,847	104,719
Feldspar, long tons.....	8,900	45,200
Chrome iron ore, long tons.....	3,599	53,985
Graphite, pounds.....		77,500
Fluorspar, short tons.....	8,250	55,328
Slate ground as a pigment, long tons.....	2,000	20,000
Cobalt oxide, pounds.....	10,000	25,000
Novaculite, pounds.....		69,909
Asphaltum, short tons.....	40,841	190,416
Asbestos, short tons.....	71	4,500
Rutile, pounds.....	400	1,000
Porters' clay, long tons.....	350,000	756,000
Grindstones.....		450,000
Millstones.....		73,720
Ozokerite, refined, pounds.....	350,000	26,250
Infusorial earth, short tons.....	2,532	50,240
Soapstone, short tons.....	13,670	252,309
Fibrous talc, short tons.....	41,354	389,196
Total value of non-metallic mineral products.....		334,959,893
Total value metallic products.....		307,334,207
Estimated value of mineral products unspecified.....		10,000,000
Grand total.....		\$652,294,100

In the year 1889 the total value was \$588,278,650, while in 1888 it reached \$549,684,291.

TRADE REPORT.

Chicago.

(By Telegraph.)

Office of The Iron Age, 59 Dearborn street, CHICAGO, January 6, 1892.

The new year opened with an active trade in some branches, and a very bright prospect of its continuance. Prices have been very low up to this time, but now show some indications of stiffening on raw material, which is the basis of all values. Finished Iron and Steel are still weak, but an early improvement is expected.

Pig Iron.—Coke Irons are in active demand and the market seems to be at last turning in favor of the makers. Some very low prices have been made in the past two weeks by both Northern and Southern Iron companies, and for a time the talk was somewhat unfavorable from this cause. The largest producers in this locality are now the firmest in price, but the others have also refused contracts the past day or two at figures which they would have accepted a week or two since. The low rates on Southern Coke were altogether special, made under financial stress, and do not represent the market. Soft grades are very well sold up now and may be higher in the near future. Lake Superior Charcoal is more active also, but this is on account of the usual annual contracts, which are now coming forward. Buyers are making every effort to beat down prices, but in spite of this there is a better tone and \$17 seems to be bottom for early delivery, while higher rates are asked for scattered deliveries. The firmer feeling in Charcoal Iron is attributed to several causes, such as fewer sellers, probable scarcity of fuel this season, higher cost of ore, and the probability that a close combination of interests is about to be effected by most of the leading producers. Dearer Ore is a certainty, as the mining companies are asking from 35¢ to 75¢ per ton advance on 1000 ton lots, and will not contract for the season at even this advance. Quotations are as follows:

Lake Superior Charcoal.....	\$17.00 @	\$17.50
Local Coke Foundry, No. 1.....	15.50 @	16.00
Local Coke Foundry, No. 2.....	14.50 @	15.00
Local Coke Foundry, No. 3.....	14.00 @	14.50
Local Scotch.....	16.00 @	16.50
Ohio Strong Softeners.....	17.75 @	18.25
Southern Coke, No. 1.....	15.75 @	16.00
Southern Coke, No. 2.....	14.75 @	15.00
Southern Coke, No. 3.....	14.00 @	14.25
Southern, No. 1, Soft.....	14.75 @	15.00
Southern, No. 2, Soft.....	14.00 @	14.25
Southern Gray Forge.....	13.75 @	14.00
Southern Mottled.....	13.25 @	13.50
Tennessee Charcoal, No. 1.....	17.50 @	18.00
Alabama Car Wheel.....	19.50 @	20.50
Coke Bessemer.....	16.50 @	17.00
Hocking Valley, No. 1.....	17.25 @	18.50
Jackson County Silvery.....	17.50 @	18.00

Spiegeleisen—Is unchanged at \$28 for 20 %.

Bar Iron.—The improved tone noted last week was followed by a slight relapse. Some concerns are evidently in need of work and have made concessions, but it is doubtful if standard Iron can be had under 1.65¢, half extras. Chicago. The Youngstown Mills are doing a moderate business at 1.55¢ at mill, or 1.70¢, Chicago, and agents report these mills well fixed for some weeks. Heavy orders for Car Iron have been placed at 1.70¢ flat.

Plates and Structural Material.—The Plate market is quiet so far as mill orders are concerned, but business is fairly active from store, prices ruling as follows: Sheet Iron or Steel, Nos. 10 to 14, 2.50¢ @ 2.60¢; Tank Iron or Steel, 2.40¢ @ 2.60¢; Shell Steel, 2.75¢ @ 3¢; Flange Steel, 3¢ @ 3½¢; Boiler Rivets, 4¢ @ 4½¢; Angles, 2.20¢ @ 2.40¢; Tees, 2.60¢ @ 2.75¢. The combination price on Boiler

Tubes is so far from being recognized that no general quotations are made; manufacturers' agents quote mill lots of Tank Steel at 2¢ @ 2.10¢, Chicago; Angles, 2¢ @ 2.15¢; Beams, 3.20¢. Bridge work is very dull at present, but considerable business is doing in Beams for delivery the coming season.

Sheets.—A few large contracts are in sight, but, generally speaking, the market for Black Sheets is dull. Prices are a little weaker, and while 2.90¢, Chicago, is the quoted rate for No. 27 Common, it is not certain that it is bottom. Galvanized Iron, on the contrary, is active and higher. The new list has been accepted by the trade, and the tendency is upward along the line. Jobbers quote Juniata 60 % and 10 % off, and No. 27 Common Black 3.10¢.

Merchant Steel.—Miscellaneous business is moderate, but sufficient to keep mills well employed, in connection with their season contracts. Carload lots of Bessemer Bars from mill are quoted at 1.90¢, Chicago; Machinery, 2.10¢ @ 2.15¢; Open-Hearth Carriage Spring, 2.05¢ @ 2.10¢. Tool Steel sells at 6¢ and upward, according to quality. The market for Railroad Spring Steel is demoralized by the Spring makers themselves, nearly all of whom now make their own Steel.

Track Supplies.—The demand is active for all kinds of material. Orders are being entered constantly for small lots of Steel Rails, and inquiries are numerous for large lots. Not all of the leading lines have yet closed for their annual requirements, and a heavy year's business seems almost positively assured. A feature of the present demand is the inquiry for small lots for prompt shipment. The South Chicago mill is now in full operation, and the Union Works will be started February 1 or soon after. Prices range from \$31 upward, according to quantity, time of delivery, &c. Season contracts for Splice Bars have been taken at close to our quotations. We quote Spikes 2.20¢ @ 2.25¢; Iron or Steel Splice Bars, 1.80¢ and Track Bolts with Hexagon Nuts 2.70¢.

Old Rails and Wheels.—Old Iron Rails are stiffer, although business is rather light; they are quoted all the way from \$21.75 to \$22.25. Old Steel Rails are still being purchased by dealers at \$13.50 @ \$15, according to length. Old Car Wheels seem to have been pretty well cleaned up. They are quoted by dealers at \$16 @ \$16.25, but are quite scarce.

Scrap.—A little more inquiry is noted from consumers, but they are all hunting for bargains. Dealers anticipate an improvement and are firm at last week's quotations, as follows, per net ton: No. 1 Railroad, \$18.50; No. 1 Forge, \$17.50; Horse Shoes, \$18; Car Axles, \$22; Fish Plates, \$20; No. 1 Mill, \$12.50; Pipes, \$11.50; Sheet Iron, \$8; Cast Borings, \$7; Wrought Turnings, \$10; Axle Turnings, \$12; Machinery Cast, \$12; Malleable Cast, \$9; Stove Plate, \$9; Mixed Steel, per gross ton, \$11.75; Coil Steel, \$15.50; Leaf Steel, \$17.75.

Metals.—Copper has fluctuated considerably the past week, prices varying ¼¢ in a day. Carload lots of Lake were quoted yesterday at 11¢ and Western casting Copper 10½¢. Spelter is weak at 4.60¢. Everett & Post of Chicago issue the following review of the market for Pig Lead: The closing week of the year presented no new features in the Pig Lead markets of the world. Reports so far received show the production in the United States to have been some 190,000 tons, which amount has been practically absorbed and some 6000 tons additional, and we start the new year with low stocks of the metal at all points. The year 1891 was

a remarkably steady one as to prices, the influence of the trusts in the market. In Europe production has increased about 10 %, principally by reason of the large influx of Australian ores. Production has kept pace with the consumption, and stocks foot up about 11,000 tons. The week just closing shows but small sales here, principally of Missouri Lead and at 4.05¢. The trade are holding off until after turn of the year. The average price for Lead in Chicago for the year 1891 was 4.19¢, as against 4.28¢ for 1890. The following table gives monthly average of Pig Lead in Chicago for 1891, with yearly averages for five preceding years:

January.....	4.25 ¢
February.....	4.14 ¢
March.....	4.12½ ¢
April.....	4.06 ¢
May.....	4.12½ ¢
June.....	4.31 ¢
July.....	4.30 ¢
August.....	4.32½ ¢
September.....	4.35 ¢
October.....	4.23 ¢
November.....	4.05 ¢
December.....	4.04 ¢
Average for the year.....	4.19 ¢
Average for 1890.....	4.28 ¢
Average for 1889.....	3.67½ ¢
Average for 1888.....	4.30 ¢
Average for 1887.....	4.34 ¢
Average for 1886.....	4.50 ¢

Chas. H. Hawkins, Phenix Building, Chicago, agent for Fayette Brown, receiver Brown, Bonnell & Co., has issued a daily memorandum calendar for 1892, the receipt of a copy of which is acknowledged.

Charles Himrod & Co., Rookery Building, Chicago, announce to the trade that on and after January 1, 1892, they will be succeeded in their Pig Iron commission business by the firm of Dunham, Keedy & Hagerty, composed of A. H. Dunham, D. V. Keedy and T. A. Hagerty. These gentlemen have had entire charge of the firm's Pig Iron department for the past 15 months. The Irons which Dunham, Keedy & Hagerty will handle include such well-known brands as the following: Rockwood and Citico, Soft Tennessee Coke; Ashland, High Silicon Silvery; Globe, Jackson County Silvery; Iroquois, Strong Lake Superior Coke; Sterling Scotch, Standard American Scotch; Deer Lake and Northern, Lake Superior Charcoal. Dunham, Keedy & Hagerty have just issued their chart, showing graphically the fluctuations in Lake Superior Charcoal and No. 1 Coke Pig Iron at Chicago from 1882 to 1891 inclusive. They remark as follows upon the Pig-Iron market for 1891: "1. While the production has been enormous, and although the railroad and Steel-Rail trade have been comparatively quiet, yet miscellaneous consumption has been so unusually heavy that stocks at the close of the year show but a slight difference from those a year ago. 2. The remarkable steadiness in prices of Coke Iron. There has been less variation in prices than during any previous year, the greatest falling off being observed on Charcoal, while Coke Irons have not varied during the entire year more than 50¢ per ton. 3. The year closes with a production exceeding that of any one time in the history of the Iron trade."

Louisville.

LOUISVILLE, KY., January 4, 1892.

Pig Iron.—There has been no improvement in prices, for while one or two furnaces who had sold heavily ahead continue to ask \$11.50 for No. 2 Foundry, and other prices in proportion, for delivery during six months, there are others that are willing to sell upon as low basis as at any time in the past. Contracts for delivery during six months upon basis of

\$9.50 for Gray Forge, at furnace, have been made, and for prompt delivery actual sales of No. 2 Soft were made by one district as low as \$9, Birmingham basis. While sales for certain companies continue at such low prices, it will not be easy for a general movement of higher prices to take place. Reports from the East have been discouraging, save from the Pittsburgh district, where Gray Forge has been 50¢ and Bessemer \$1 higher, but as this advance still leaves the Iron on an extremely low basis, it has not given special encouragement to consumers here to buy heavily for future needs. The disposition on the part of railroads to buy sparingly, notwithstanding their needs, prevents Car-Wheel Irons from moving up, and there is a tendency shown by the large companies to buy only from time to time, instead of placing large orders at once, as in some instances they feel that they can buy later for as low prices as at the present moment, and in others they do not care to place all their orders at once lest prices should advance owing to the stimulant of large buying, which they are desirous of avoiding. We quote for cash, f.o.b. cars Louisville:

Southern Coke, No. 1 Foundry ..	\$14.25 @ \$14.75
Southern Coke, No. 2 Foundry....	13.50 @ 14.00
Southern Coke, No. 3 Foundry.....	13.00 @ 13.50
Southern Coke, Gray Forge	12.25 @ 12.75
Southern Charcoal, No. 1 Foundry..	15.75 @ 16.75
Southern Car Wheel.....	17.75 @ 19.75

Philadelphia.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, Pa., January 5, 1892.

Business has not been fully resumed as yet, so that it may be a little premature to say what the immediate course of the market is likely to be. There are no developments of weakness, however, but in some specialties there are very decided indications of strength, so that on the whole the disposition is to regard the market as an improving one, although buyers are still disposed to be conservative. This is especially the case as regards Pig Iron, of which there seems to be a full supply, although there is no unusual pressure and certainly no weakening in prices compared with those ruling during November or December. In Bessemer Pig and in Steel Billets there is an improving demand at advancing prices, while in finished material there is continued irregularity, without decided change either for better or worse.

Pig Iron.—A large business has been done during the past couple of weeks, considering that it was the holiday season. Anything that had a bargain-like appearance was quickly taken up, and at full quotations there was quite an average demand, and in some instances a little more than that. Meanwhile, as producers and consumers have both made arrangements for their immediate requirements, the market is hardly likely to show much change until some definite idea can be formed as to the proportions of supply and demand during the next three or four months. The general disposition has been to look for an increased consumption, but whether that will be developed at once or remain in abeyance until later on remains to be seen. The improved demand for Bessemer and low phosphorus Iron is regarded as a favorable indication, but with the current output of furnaces at the highest point on record, consumers are not laboring under any serious apprehension of higher prices, and, moreover, there is such a discrepancy in quotations that it is difficult to determine what figure does represent an advance or the reverse. One seller may quote an Iron as No. 2 which another would grade as a No. 1, and in that way innumerable changes are made nominally, while as a matter of fact there is no change whatever. As an illustration of this point, sales have been re-

ported within the past week at prices varying from \$15 to \$17 for No. 2 Foundry, and from \$16 to \$18 for No. 1, deliveries being in no case more than 50¢ apart. Some portion of the difference may be due to the established character of one brand, or it may be because of uncertainty in regard to the other, but all the same, it is impossible to determine which of these figures most nearly represents the actual conditions of the market, as equal grading is claimed for both Irons. During the recent depression there has no doubt been a good deal of sleight-of-hand work going on, such as giving a high grading for, say, a No. 2 Iron, to cover a sale at what would have been an extremely low price for No. 1, which the buyer was supposed to be getting, and in other cases making an apparently high price, but furnishing a grade still higher. To what extent this has been done it is not easy to say, but a great many sellers claim that "the other fellow" does it all the time, so that No. 2x or No. 2 plain not unfrequently mean one and the same thing. Quotations, therefore, without actual details, are necessarily less definite than formerly. The general range of prices appear to be as follows, with a rebate of 25¢ @ 50¢ for deliveries within 100 miles south or west of Philadelphia.

Ohio Softeners, No. 1x.....	\$18.00 @ \$18.50
Ohio Softeners, No. 2x.....	17.00 @ 17.50
Standard Penna, No. 1x.....	17.50 @ 18.00
Standard Penna, No. 2x.....	16.00 @ 16.50
Medium Penna, No. 1x.....	17.00 @ 17.25
Medium Penna, No. 2x.....	15.75 @ 16.00
Plain No. 2 Southern.....	14.50 @ 15.00
Virginia, No. 1x.....	16.00 @ 17.00
Virginia, No. 2x.....	15.00 @ 15.75
Standard Neutral All-Ore Forge	14.25 @ 15.00
Ordinary Forge Cinder mixed ..	13.50 @ 14.00
Hot-Blast Charcoal.....	20.00 @ 22.00
Cold-Blast Charcoal.....	24.00 @ 27.00

Bessemer and Low Phosphorus Irons.—There is a revival of interest in these specialties, with sales of the last mentioned at about \$19, delivered at near-by points. Inquiries are on the market for larger lots, but the supply at furnaces (except misfits) is pretty well exhausted, so that it may require the stimulus of better prices or the guarantee of larger orders to start furnaces on this class of work. Sellers talk about \$17 for Bessemer and \$19 for low phosphorus, with the chances said to favor higher rather than lower figures.

Steel Billets.—The feeling is unsettled and feverish, owing to the fact that makers are talking considerably higher prices, especially for deferred deliveries. Quite a large business has been done during the past week, and in all cases at advancing prices. Comparatively low figures—say \$26.50—have been quoted for January, but \$26.75 @ \$27 is named for February, and \$27.25 and upward for March, with business closed for all the months at prices above named for tidewater, and about 50¢ less for Harrisburg or its equivalent.

Steel Rails.—Without any specially large individual orders the aggregate amount taken is quite encouraging to manufacturers. The indications become more favorable as the season advances, and the prediction made by a manufacturer at the last meeting that the mills would have all the business they could handle by March 1 bids fair to be realized.

Muck Bars.—Little or no business has been done for some time past, although lots here and there are offered at extremely low figures, but buyers appear to be quite indifferent. Probably \$26.50 @ \$27 would be asked for first-class Bars, but some lots said to be of good quality have been offered at less than \$26, delivered, without finding a buyer.

Bar Iron.—Some slight improvement is noted in the demand, but there are still plenty of sellers at the old figures. There

is less disposition to cut prices, however, and if business comes in as there is some reason to expect, a slight stiffening will probably be seen before the end of the month. A few good sized orders have already been taken, and 1.70¢ @ 1.75¢ appear to be inside rates for really first-class Iron; some, indeed, claim to be getting 1.80¢, but that can only be done for special Iron for special purposes, 1.70¢ being the usual quotation for good Iron, and 1.65¢ @ 1.70¢ at interior points.

Plates.—A very fair amount of business has been forthcoming, notwithstanding the holiday season, but prices have been as low as ever. As a matter of fact, no one seems to have courage enough to ask more money, the main idea for the present being to secure plenty of business. In this respect the outlook is quite encouraging, but the immense capacity for production largely offsets the improved prospects. The advance in unfinished Steel, however, may have the effect of giving a better tone to Plates, which, especially in the higher qualities, have been greatly demoralized in recent transactions. The market is still a little unsettled, and, as a rule, quotations show no improvement on those ruling during December, but for reasons above stated (better demand and higher cost) there is a general impression that a slight advance will be realized at an early date. Meanwhile quotations are about as follows:

	Iron.	Steel.
Tank Plates....	1.90 @ 2.00¢	1.90 @ 2.00¢
Refined.....	2.20 @ 2.30¢	2.00 @ 2.10¢
Shell.....	2.30 @ 2.40¢	2.20 @ 2.30¢
Flange.....	3.20 @ 3.30¢	2.40 @ 2.60¢
Fire-Box.....	4.00 @ 4.25¢	2.80 @ 3.00¢

Structural Material.—A fair amount of business has been coming in, in a small way, but nothing heavy either for immediate or deferred deliveries. There is the usual talk of business to be placed at an early date, but meanwhile mills are doing little beyond holding their own. Prices irregular, but usually quoted about as follows: Angles, 1.95¢ @ 2.05¢; Universal Plates, 2¢ @ 2.10¢; Sheared Plates, 1.90¢ @ 2¢, and in some cases lower prices, to about 1/16¢ more, for Steel, according to requirements. Tees, 2.5¢ @ 2.6¢; Beams and Channels, 3.1¢ for either Iron or Steel.

Sheet Iron.—The demand has been large for the season, and some of the mills have been agreeably surprised at the amount of business sent into them. There is still a good inquiry and prices remain at about the following figures for best makes:

Best Refined, Nos. 14 to 20.....	3.00¢ @ 3.05¢
Best Refined, Nos. 21 to 24.....	3.10¢ @ 3.15¢
Best Refined, Nos. 25 to 26.....	3.20¢ @ 3.25¢
Best Refined, No. 27.....	3.40¢ @ 3.45¢
Best Refined, No. 28.....	3.50¢ @ 3.55¢

Common, 1/2¢ less than the above.

Quotations given as follows are for the best Open-Hearth Steel, ordinary Bessemer being about 1/2¢ lower than are here named:

Best Soft Steel, Nos. 14 to 20.....	3¢ @ 3 1/2¢
Best Soft Steel, Nos. 21 to 24.....	3 1/2¢ @ 3 3/4¢
Best Soft Steel, Nos. 25 to 26.....	3 3/4¢ @ 3 1/2¢
Best Soft Steel, Nos. 27 to 28.....	4¢ @ 4 1/4¢

Best Bloom Sheets, 1/2¢ extra over the above prices.

Best Bloom, Galvanized, discount....	@ 67 1/2 %
Common, discount.....	@ 70 %

Old Material.—Supplies are somewhat limited, so that buyers of goods qualities have to pay pretty full prices. Inferior and mixed lots are relatively weak, but in ordinary cases prices are about as follows: Iron Rails, \$21.50 @ \$22 asked; Steel Rails, \$16 @ \$17, delivered; No. 1 Railroad Scrap, \$20.50 @ \$21, Philadelphia, or for deliveries at mills in the interior \$20.50 @ \$21.50, according to distance and quality; \$14.50 @ \$15.50 for No. 2 Light; \$14 @ \$14.50 for best Machinery Scrap; \$13.50 @ \$14 for ordinary; \$14.50 @ \$15.50 for Wrought Turnings; \$10 @ \$10.50 for Cast Borings, and nominally \$23 @ \$25 for Old Fish Plates,

and \$16 @ \$16.50, delivered, for Old Car Wheels.

Wrought-Iron Pipe.—Business is in a very unsatisfactory condition, and prices greatly demoralized. Discounts vary from 2 1/2 % to 10 % from the nominal figures, which are supposed to be as follows, but there is really no fixed price to anything:

Butt-Welded Black.....	57 1/2 %
Butt-Welded Galvanized.....	47 1/2 %
Lap-Welded Black.....	67 1/2 %
Lap-Welded Galvanized.....	55 %
Boiler Tubes, 2 1/2 inch and under.....	52 1/2 %
Boiler Tubes, 3 to 6 inch.....	60 %
Boiler Tubes, 7 inch and larger.....	55 %

The many friends of the old house of Morris, Wheeler & Co. and of the following gentlemen individually will be pleased to learn that Messrs. Benjamin T. Longstreth, Andrew Wheeler, Jr., and Frederick W. Morris, Jr., have been admitted to membership in the firm, commencing from January 1.

Cleveland.

CLEVELAND, January 4, 1892.

During the past week over 60,000 tons of Ore have been forwarded to the furnace from the lower lake ports, against 40,000 tons for the corresponding week last year. This activity, if continued, as now seems entirely probable, means that the season of 1892 will open with the docks almost entirely clear of old Ore. It seems to be generally understood that next season's prices will be slightly in advance of those prevailing during the past two or three months. The persistency with which several furnacemen in the East and in the Mahoning and Shenango valleys are asking for next season's quotations indicates that there will be a very lively demand for Ore this year. Quite a large amount of Ore is being received by rail, and it is quite probable that the total receipts at the lower lake ports for 1891 may considerably exceed 6,000,000 tons. It is now believed that a considerable amount of the output of 1892 will have been sold before navigation opens. Indeed, it would not be surprising if a number of large sales were made during the next five or six weeks. It seems to be generally conceded that from 2,000,000 to 2,500,000 tons of Ore will be sold this year in excess of the output of 1891. Quotations are, of course, quite uncertain, but the mine owners and dealers assert, with great confidence, that desirable grades of Ore will command from 50¢ to \$1 more per ton than was obtained last year. Several thousand tons of unsold Ore on the docks in this city were purchased during the past week at prices averaging about 50¢ per ton, above midsummer quotations.

Pig Iron.—The holidays over, business is picking up again. There is a surprisingly good demand for Bessemer at advances of 25¢ to 75¢ per ton. The demand for high-grade Bessemers seems almost universal. There is nothing really indicating a boom in the present situation, but the feeling seems general that the new year has opened auspiciously, and that the improvement in demand and quotations presages a good year. We hear of sales of Bessemer at \$16.25 @ \$16.50, and of No. 1 Foundry at \$16.70. These quotations are strictly local, and may be taken as an indication of the sentiment of Cleveland dealers regarding the situation and outlook. It may be added that a steady improvement is looked for, the present healthy boom coming at a time when many furnaces are taking inventories and are really out of the market. Strictly local quotations are as follows:

Nos. 1 to 6 Lake Superior Charcoal	\$18.50 @ \$19.00
Nos. 1, 2 and 3 Bessemer, per ton..	16.00 @ 16.25
No. 1 Strong Foundry, per ton..	16.20 @ 16.70
No. 2 Strong Foundry, per ton..	15.20 @ 15.70
No. 1 American Scotch, per ton..	16.20 @ 16.70

No. 2 American Scotch, per ton..	15.20 @ 15.70
No. 1 Soft Silvery, per ton.....	16.50 @ 17.50
Mahoning and Shenango Valley	
Neutral Mill Irons, per ton....	14.00 @ 14.25
Mahoning and Shenango Valley	
Red Short Mills, per ton.....	14.50 @ 15.00

Nails.—Prices for Wire Nails have again declined and are now announced at \$1.75, in stock, while Steel Cut Nails are reduced to \$1.65. The market is quite weak, and there are even indications of a further decline.

Old Rails.—The market is rather slow, Old Americans selling at \$22.50 @ \$23, with the demand somewhat limited. We hear of a sale of 1000 tons of Americans at \$22.75, Cleveland delivery.

Scrap.—The market shows some sign of improvement. During the past week No. 1 Railroad Wrought has sold at \$19 @ \$19.25, and Cast Scrap at \$13.50.

Manufactured Iron.—The mills seem busy enough, but business is really not very active and some improvement is looked for after the middle of the month.

Pittsburgh.

Office of The Iron Age, Hamilton Building, Pittsburgh, January 5, 1892.

The year just closed has been an active one. The volume of business was no doubt larger than ever before, but under the influence of an active competition, prices were kept down very low, affording a modest margin for profit. Two well-known firms, Moorhead-McCleane Company and Oliver & Roberts Wire Company, were obliged during the year to ask their creditors for an extension. The outlook for 1892 so far as the demand is concerned is very encouraging and manufacturers are hopeful of being able to realize more remunerative prices. Capacity has been largely increased in all lines. It may be added in connection with the above that there are firms weak financially, and these are responsible largely for the low prices. In nine times out of ten this is the reason why both raw material and products are sold so close to cost of production.

Pig Iron.—There has been a very fair degree of activity developed during the past week, but no further change in prices. A good, regular demand is expected, but there is no indication of a boom. Our city furnaces have all been selling pretty freely of late, and are pretty well sold ahead, but it is well to bear in mind in this connection that consumers here are well bought ahead, so that the one offsets the other. While Bessemer Iron has advanced from 50¢ to 75¢ per ton as compared with the lowest point, other grades remain unchanged. Forge Iron is firmer, but as yet there have been few sales at any advance. Some furnacemen, being well sold ahead, are indifferent about making additional contracts at present prices, which we quote as follows:

Neutral Gray Forge.....	\$13.50 @ \$13.75, cash.
All-Ore Mill.....	14.00 @ 14.50, "
White and Mottled.....	12.50 @ 13.00, "
No. 1 Foundry.....	15.50 @ 16.00, "
No. 2 Foundry.....	14.50 @ 15.00, "
No. 3 Foundry.....	14.00 @ 14.25, "
No. 2 Charcoal Foundry.....	20.50 @ 21.00, "
Cold-Blast Charcoal.....	25.00 @ 27.00, "
Bessemer Iron.....	15.75 @ 16.00, "

For Bessemer Iron, \$15.75, cash, is generally regarded as the market price. There has been an increased business in Foundry Iron. A lot of 1000 tons No. 3 was reported at \$14.25, and 700 tons No. 2 at \$14.50, cash. It is the opinion of careful and well-posted operators that there is not much risk in buying Iron at present prices. Whenever Pig Iron gets down close to cost of production, as is the case at present, there can be but little danger in buying it.

Muck Bars.—The dullness which has prevailed for several weeks continues, but it is thought that there will soon be an im-

proved demand. It is being offered freely at \$27, cash, for almost any delivery between now and April, and it is intimated that it might be bought for less.

Manufactured Iron.—The general situation remains much the same as noted a week ago. Business is generally reported quiet, but there is a very general expectation that it will improve. Car builders have been buying freely for some time past, and nearly all the mills in the Shenango and Mahoning valleys are pretty well filled up with orders of this character. We continue former quotations: City-made Bars, 1.67¢ @ 1.70¢; Plate and Tank, 1.90¢ @ 2¢; No. 24 Sheet, 2.60¢; all 60 days, 2 % off for cash. Skelp Iron, 1.62½¢ @ 1.65¢ for Grooved and 1.85¢ @ 1.90¢ for Sheared, four months, 2 % off for cash.

Nails.—Steel Cut Nails are still quoted at \$1.55 @ \$1.60 for 30¢ @ 35¢ average, f.o.b. at factory in the Wheeling district. Trade continues quiet. While reports obtain of sales having been made as low as \$1.60, f.o.b. at factory, manufacturers of Wire Nails are holding at \$1.70, 60 days, 2 % off for cash, f.o.b. at factory, and then only for immediate or near-by delivery. Some manufacturers are inclined to believe that the very low prices set afloat of late were for the purpose of bearing the market. Even at \$1.70 we are assured by manufacturers that there is little or no margin for profit. It is expected that there will be some large buyers on the market before long, but if they are expecting to load up at \$1.60 they will probably be disappointed.

Wrought Iron Pipe.—There is nothing new to report; business continues light, as it usually is at this particular time. The market is practically an open one. The following discounts are pretty generally adhered to: On Butt Black, 57½ %; Galvanized, 47½ %; Lap Black, 67½ %; do. Galvanized, 55 %; Boiler Tubes, all sizes up to 2½-inch, inclusive, 55 %; 3-inch and larger, 65 %; Casing, all sizes, 55 %. The January meeting of the Manufacturers' Association takes place in this city.

Old Rails.—The dullness noted for some time continues, but prices remain unchanged. We note a sale of 1000 tons of Iron Rails at \$22.50, at Youngstown, Ohio. Old Steel Rails are quoted at \$16.75 @ \$17 for short and \$17.50 for long pieces.

Structural Material.—No change in prices. Channels and Beams, 3.10¢; Tees, 2.30¢ @ 2.40¢; Universal Mill Plate Iron, 1.90¢ @ 2¢; Sheared Bridge Plates, 2¢ @ 2.10¢; Refined Bars, 1.75¢ @ 1.80¢.

Steel Plates.—Business is still reported dull, while prices remain unchanged: Fire Box, 3.50¢ @ 4.25¢; Tank, 1.85¢ @ 2¢; Shell, 2¢ @ 2.10¢; Flange, 2.25¢ @ 2.50¢.

Barb Wire.—Prices remain unchanged. Painted, \$2.45; Galvanized, \$2.95, f.o.b. at factory in the Pittsburgh or Cleveland districts. It is reported that considerable business has been done of late, and that the mills both in and out of the syndicate are pretty well supplied with orders.

Wire Rods.—There have been no actual sales reported for some time and in the absence of the same we quote at \$34, cash, f.o.b. at makers' mill. There is a firmer tone, in sympathy with Steel Billets.

Steel Rails.—Business has been quiet the past week, but the mills have well sold up. Prices unchanged at \$30, f.o.b. at mill.

Steel Billets.—The recent sharp advance, as might be expected, has checked the demand, buyers being disposed to hold off for a time to see whether or not the advance will be maintained. The asking

price remains as quoted a week ago, \$25, cash, at makers' mill.

Railway Track Supplies.—There is a continued good demand and prices are firm as quoted: Spikes, 2.15¢, f.o.b. at makers' works; Splice Bars, 1.70¢ @ 1.80¢; Track Bolts, 2.65¢ with Square and 2.75¢ with Hexagon Nuts.

Merchant Steel.—There is only a fair business.

Old Material.—Business has been very light for some weeks past.

Connellsville Coke.—There is a fair business at unchanged prices: Furnace Coke, \$1.90; Foundry do., \$2.30; Crushed do., \$2.65, all per net ton, f.o.b. cars at ovens.

(By Telegraph.)

The Soft Steel men from Wheeling and Mahoning Valley district held a meeting here yesterday, the main objects of which appears to have been to compare notes and arrive at a better understanding with each other. Pittsburgh manufacturers did not participate in the meeting. Bessemer Pig Iron steady at \$15.75, cash. Sales of Steel Billets have been made at \$25.

Alexander Thomas & Co., Iron and Steel factors, German National Bank Building, Pittsburgh, Pa., have been appointed the exclusive selling agents west of the Allegheny Mountains for the Monongahela furnace department of National Tube Works Company's Foundry and Special Pig Irons. These Irons are made specially from the best Lake Superior Ores, and are an extra quality, in order to meet the high requirements of their own business. They are soft, strong and are specially adapted for general foundry use.

Detroit.

WILLIAM F. JARVIS & Co., Detroit, Mich., under date January 4, 1892, say: There has been no change whatever either in buying or in prices since our report of a week ago. Inquiry for a considerable quantity of Lake Superior Charcoal and Bessemer Iron was the only happening of any note, beyond a few small orders for a carload or two for present needs. We repeat quotations:

Lake Superior Charcoal, all numbers.....	\$17.00 @ \$18.00
Lake Superior Coke, Bessemer.....	16.50 @ 17.00
Lake Superior Coke Foundry, all ore.....	17.50 @ 18.00
Ohio Blackband (40 per cent.).....	18.00 @ 18.50
Southern No. 1.....	16.25 @ 16.50
Southern Gray Forge.....	14.00 @ 14.50
Jackson County (Ohio) Silvery.....	18.25 @ 18.75

Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fourth and Main Sts., CINCINNATI, January 6, 1892.

Pig Iron.—There has not been much increase in the volume of business during the week, but there was a fair volume of current consumptive orders, which in the aggregate make a fair showing for this season of the year. One sale of 14,000 tons was made for delivery this month and next, but it was a mixture of Gray Forge, No. 2 and 3 Foundry and Ohio Softeners, and while the prices did not transpire, it is presumed that they were on the basis of quotations. It is quite certain that there are ample offerings of Iron by the Southern furnaces, and that some of them are so desirous of selling that they would make concessions, while there are others who have booked liberal orders and have withdrawn temporarily from the market. There is an undertone of confidence

that consumption will enlarge during the year, but it is uncertain when it will pass the limits of production, and until it does so there is not likely to be that strength in the market which all producers are anxious to see. There has been no increase in the buying of Charcoal Iron, and quotations are merely nominal, but there is no urgency to sell. Much stress is laid upon the advance in Bessemer Iron and in Steel reported from Pittsburgh, but aside from the general effect upon the sentiment of the trade it does not appear to have had much influence. It has not stimulated the market for Pig Iron nor caused any increase in the volume of business. Collections are generally improving and the money market is easy. Quotations are unchanged, as follows:

Foundry.

Southern Coke, No. 1.....	\$14.75 @ \$15.00
Southern Coke, No. 2.....	13.75 @ 14.00
Southern Coke, No. 3.....	12.75 @ 13.00
Ohio Soft Stone Coal, No. 1.....	16.25 @ 16.50
Ohio Soft Stone Coal, No. 2.....	15.50 @ 16.00
Mahoning and Shenango Valley.....	17.00 @ 17.50
Hanging Rock Charcoal, No. 1.....	20.00 @ 21.00
Hanging Rock Charcoal, No. 2.....	19.00 @ 20.00
Tennessee and Alabama Charcoal, No. 1.....	16.50 @ 17.00
Tennessee and Alabama Charcoal, No. 2.....	15.50 @ 16.00

Forge.

Gray Forge.....	12.25 @ 12.50
Mottled Neutral Coke.....	11.75 @ 12.00

Car Wheel and Malleable Irons.

Standard Southern Car Wheel.....	19.25 @ 19.50
Lake Superior Car Wheel and Malleable.....	18.25 @ 18.50

New York.

Office of *The Iron Age*, 96-102 Reade street, NEW YORK, January 6, 1892.

American Pig.—As yet no movement of any consequence has taken place in the market. There seems to be less pressure to sell Bessemer and special Irons on account of the reported advance in Pittsburgh. That advance does not, however, appear to be thoroughly established yet, since \$15 has been named within three days, when the parties negotiating came down to close business. Southern Iron continues irregular, with pressure to sell. We quote Northern brands, \$16.75 @ \$18 for No. 1; \$16 @ \$16.50 for No. 2, and \$14 @ \$14.50 for Gray Forge. Southern Iron sells at \$16 @ \$17 for No. 1; \$15.25 @ \$16 for No. 2 and \$13.75 @ \$14.50 for Gray Forge. The production of Coke Iron, including the stacks so grouped by us in our monthly reports, was 3,500,000 tons, that of Anthracite Pig 875,000 tons, and of Charcoal 260,000 tons, making the total 4,635,000 gross tons, or, roughly, 5,200,000 net tons—the net ton being unfortunately used by some statisticians.

Spiegeleisen and Ferromanganese.—There is no movement whatever in foreign Spiegeleisen, while in foreign Ferro the market is at a standstill. Importers cannot meet the prices being made in the West by domestic manufacturers, who take all the business in that section, which consumes the largest quantity of Ferro. Importers claim that they cannot do better than \$62 @ \$62.50 for Ferro, \$23 @ \$23.50 for 10 and 12 %, and \$26.75 @ \$27 for 20 %.

Billets and Rods.—It is reported that considerable sales have been made in Philadelphia territory, while little has been closed in this vicinity. The Pittsburgh advance does not seem to be general with the producers of that district. When it is a question of reaching into Eastern competitive territory there is some disposition to make old prices. We learn that \$24 has been shaded as a quotation on orders emanating outside the Pittsburgh district. Foreign Billets are dull at nominally \$30.75 @ \$31, and American Wire Rods are \$37 @ \$37.50, tidewater, nominally.

Steel Rails.—Since the placing of the New York Central order alluded to in our last issue, there have been no sales of any magnitude. Among the smaller current transactions we note a lot of 1800 tons for a Florida road. Some very surprising blunders have been made by the *Engineering and Mining Journal* in a reference to the statistics of the Steel Rail trade. Our contemporary states that the production in 1890 was 2,095,996 tons, when, as a matter of fact, it was 1,885,307 gross tons in that year. The same statistician places the product of 1891 at 1,090,000 tons, in ignorance of the fact that the shipments as reported by the association cover only Rails of standard section. Up to July 1 of last year the shipments were 454,423 tons. Swank, for the first half of the year, reported a Rail product of 517,788 gross tons. This is a matter which every one in the Rail trade is thoroughly familiar with. The light Rail output carries the product up to at least 1,225,000 tons. The falling off in product was, therefore, only 660,000 tons, and not a round million, as our contemporary puts it. Such blunders are discreditable.

Manufactured Iron and Steel.—Aside from the sale of a lot of 300 tons of Beams for the Lincoln Deposit Building, no transactions of consequence have been reported in Structural Material, the mills and merchants generally reporting the trade very dull. The figures for the production of American Beams are not yet available, the reports not having been received as yet. An excellent authority estimates the total at 100,000 net tons, which is less than is generally figured, and is said to be due to the unfavorable character of the general condition of business last year. In Plates some low figures are being named on high-grade Locomotive Fire-Box Steel. We quote: Angles, 1.90¢ @ 2.10¢; Sheared Plates, 1.85¢ @ 2.25¢; Tees, 2.40¢ @ 2.75¢, and Beams and Channels, 3.1¢, on dock. Steel Plates are 1.9¢ @ 2.1¢ for Tank; 2.15¢ @ 2.30¢ for Shell; 2.40¢ @ 2.65¢ for Flange; 2.60¢ @ 2.75¢ for Marine, and 3¢ @ 3.25¢ for Fire Box, on dock. Bars are 1.7¢ @ 1.9¢, on dock. Scrap Axes are quotable at 2¢ @ 2.20¢, delivered. Steel Axes, 2¢ @ 2.2¢, and Links and Pins, 2.1¢ @ 2.20¢; Steel Hoops, 1.95¢ @ 2.05¢, delivered.

Merchant Steel.—We quote Hot-Rolled Shafting 1.95¢ @ 2.10¢; Machinery, 2.05¢ @ 2.15¢; Tire, 2.10¢ @ 2.25¢, and Toe Calk, 2.15¢ @ 2.25¢, delivered.

Financial.

A quiet but assured tone pervades business circles, for while the volume of current transactions is moderate, the many evidences of general prosperity and soundness in the various departments of trade and industry are too positive to be mis taken or ignored. Large expectations are founded on heavy railroad earnings, which are a conspicuous feature of the trade situation, and go a long way to encourage the hope of railroad extensions and betterments of various kinds calling for the manufacture of railroad materials. A new construction exceeding 5000 miles for 1892 is thought not improbable. The latest reports of the gross earnings of 85 roads in all parts of the country for the third week of December show an aggregate of \$8,175,305, against \$7,624,962 in the same week of 1890, an increase of 7.22 per cent. Of course the grain-carrying roads are among the most prosperous. The forward movement to the seaboard, lately checked by the blockade, has been resumed. Burlington on a single day loaded nearly 700 cars. Weakness in grain and provisions alike is a fact not so agreeable from the agriculturist's standpoint, but it points to a renewal of the foreign demand. Corn

is particularly weak on account of augmenting supplies and the reduced farm consumption resulting from mild weather. Wheat is $1\frac{1}{4}$ ¢ lower, corn $2\frac{1}{4}$ ¢, and cotton broke to $7\frac{1}{4}$ ¢, the lowest in 40 years.

The stock market was active and strong under heavy buying from London and other sources. Not only stocks but bonds were favorably affected. Transactions in railway mortgages amounted on Saturday alone to \$2,000,000, a circumstance spoken of as quite unprecedented at this time in the year. The directors of the New York Central declared a regular dividend of $1\frac{1}{4}$ % and an extra dividend of one-fourth of 1 %, instead of making the whole 3 %, as was expected. The work of blocking the line from New York to Buffalo, now decided upon, will cost about \$750,000. The strongest stocks were Reading, Erie, the grangers, Lackawanna, New England, Louisville and Nashville, the Northern Pacifics, Richmond Terminal, Union Pacific, Missouri Pacific and Chicago Gas.

United States bonds were strong at the following quotations:

U. S. 4½s, 1891, extended.....	100
U. S. 4s, 1907, registered.....	116½
U. S. 4s, 1907, coupon.....	116½
U. S. currency 6s.....	109

Money on call was very easy until the close of the week. The average was about $3\frac{1}{4}$ %. Time money was in abundant supply at 3 % for 30 days, $3\frac{1}{2}$ % to 4 % for 60 days, and $4\frac{1}{2}$ % for 4 to 5 months. Commercial paper was in good demand, and rates were $4\frac{1}{4}$ % for 60 and 90 day indorsed-bills receivable. The bank statement showed an increase of \$480,000 cash and a decrease of \$2,247,975 in surplus reserve, making this item \$17,232,050. The loss of surplus was due to an expansion of over \$9,000,000 in loans, a feature that evoked much comment. The position, however, is strong, and taken in connection with the promised considerable return of gold from Europe, together with a continued issue of over \$4,500,000 of silver currency per month, tends to a low rate of interest. The January disbursements by the Government and corporations throughout the country for interest and dividends are estimated at \$100,000,000. London has been shipping gold to Russia and the Argentine Republic, and a further drain is anticipated.

Silver bullion certificates sold at 95. Bar silver in London $43\frac{1}{4}$ d.

Sterling exchange was dull, but steady; posted rates \$4.83 @ \$4.85½.

The annual report of R. G. Dun & Co. shows that in 1891 the total number of failures was 12,273, with liabilities of \$189,868,638, for the United States, and 1889, with liabilities of \$17,100,649, in Canada, against 10,907, with liabilities of \$189,856,064, in the United States in 1890, and 1847 failures, with liabilities of \$18,289,935, in Canada in 1890. The failures for the year just closed throughout the United States exceed in number by a large percentage those of any other previous year, being 12,273. This is an excess over 1890 of 1366. Notwithstanding this increase in number, however, the liabilities in amount are almost precisely the same as in 1890, exceeding the total of that year by only a few thousand dollars. The average indebtedness of each failure is reduced from \$17,406 in 1890 to \$15,471 in 1891. The geographical distribution of the liabilities is somewhat remarkable. The most marked change is that in the Middle and Eastern States the liabilities show a decline of about \$17,000,000, while the liabilities in the Southern States show an increase from \$27,000,000 to \$45,000,000.

Reports from the various commercial exchanges show an enlarged business. The statistics of the Stock Exchange for the year of 1891 show dealings in Government bonds to the value of \$1,539,900 and in

State and national bonds of \$389,906,700, while 2,367,000 barrels represented the transactions in oil and 72,725,864 shares the trading in stocks. At the Consolidated Stock and Petroleum Exchange the Clearing House exchanges represented 77,120,210 shares in railroad and 2,047,230 in mining stocks, \$30,796,000 in value in bonds and 47,500,000 barrels in oil. An idea of the magnitude of the business done by the New York Clearing House may be gleaned from the following figures: The total transactions for the year just ended amounted to: Exchanges, \$33,749,322,211, and balances, \$1,641,331,027, as against \$37,458,607,608 exchanges and \$1,728,587,126 balances for 1890. The grand totals of transactions for the 39 years since the Clearing House was established are: Exchanges, \$959,796,723,119, and balances, \$42,888,770,624.

The dealings at the Produce Exchange showed a general increase over those of 1890. The totals were as follows: Flour, 4,461,600 barrels; wheat, 1,692,272,000 bushels; corn, 402,957,000 bushels; oats, 107,597,000 bushels.

At the Cotton Exchange "spot" sales amounting to 128,056 bales were reported, while the dealings in options amounted to 40,944,000 bales, an increase of over 18,000,000 bales over last year.

The reports of the Coffee Exchange show a falling off in business, only 7,738,000 bags having been handled as against 9,733,000 in 1890.

The receipts at the Custom House for the year aggregated \$123,542,630 97, as against \$164,097,757 54 in 1890, a decrease of \$40,555,126 57. It had been estimated that the decrease would amount to about \$60,000,000.

The Maritime Exchange reports fewer vessels entered than last year, but the loss is made good by an increased tonnage. The average tonnage of vessels entering this port last year was 1200, as against 800 for other ports.

A strong effort will be made to induce the House Committee on Coinage, Weights and Measures to report in favor of free coinage, limited to the product of the American mines. The difference between 94½¢, the present price of silver, and \$1.29, which the mine owners hope to realize, would yield a profit of \$19,000,000 on the Government purchases of 54,500,000 ounces per annum.

Metal Market.

Copper.—Further purchases of Lake Superior product have been made by home consumers. The quantity involved, as usual when there is business of any magnitude, cannot be arrived at with accuracy, but transactions involving at least 1,500,000 pounds can be traced out at prices ranging all the way from 10½¢ up to 11¢. These were chiefly in Copper for delivery during the first quarter of the year, but some contracts, it is understood, run as far ahead as June. The upward movement in prices was assisted to some extent by inquiries from Europe, but prices accompanying the same were almost invariably below the market, and little business, if any, on foreign account has taken place. At this writing there are some home-trade inquiries at 11¢ for specified deliveries that holders do not appear inclined to accept, but the demand is not as lively just now as it was three or four days ago, and there are indications of a more conservative tendency on the part of consumers, due probably to the fact that near future wants have been fairly well provided for. In casting brands there has been business at 10¢ @ 10½¢, according to size of lot, and sellers are now holding for about $\frac{1}{4}$ ¢ advance.

Pig Tin.—The statistical position of this metal is weaker. The visible supply

for Europe and America is shown to be about 565 tons larger than it was a month ago, and the one significant feature in connection therewith is that the gain is chiefly in the quantity of Tin afloat for London, enough of which is due in the next 30 days to insure a spot supply there considerably above the late average. American spot supplies are shown to have increased about 250 tons, and the amount afloat to have fallen off 345 tons, but it is obvious that there is not only an abundance for home trade wants, but sufficient surplus to weight heavily upon some holders now that speculative interest has dwindled down to insignificant proportions. Competition between certain leading operators and a firm of long standing in the trade is said to have become quite animated of late, the drive being particularly for out of town custom, and prices are made on ordinary wholesale lots that are even closer than heretofore to those that are supposed to reflect local net cash terms for 10-ton lots. There are outstanding "puts" on 300 or 400 tons at 19.35¢ @ 19.65¢ running through the balance of the year, but otherwise few, if any, privileges that the speculative interest can turn to advantage. At the moment 19.85¢ @ 19.90¢ appears to be full value for 10-ton lots, and 20.10¢ is apparently the extreme on ordinary jobbing parcels.

Pig Lead.—Among local buyers there is no greater interest than was displayed during the holiday season, and, to all accounts, no new move has been made by sellers. The appearance of the market, in fact, is practically the same as it was a fortnight ago, with virtually a stand off between producers and consumers. Current quotations are 4½¢ bid, 4.30¢ asked. Of Chemical about 200 to 300 tons were reported sold at 4.05¢ in East St. Louis. The *Engineering and Mining Journal* prints its usual wild guess at the production statistics, the principal error lying in the output of Soft Lead. Last year, for some unaccountable reason, the product of the group—Missouri, Kansas, Illinois and Wisconsin—was jumped from 34,000 in 1889 to 55,000 tons in 1890. Now the unfortunate district, in an equally unaccountable manner, falls off 15,000 tons to 40,000 tons. As a matter of fact, even the latter figure is too high by at least 7000 tons, so that we have not, as claimed, reached the 200,000 ton mark as the annual product of the country.

Spelter.—Demand has not improved perceptibly in this quarter and the market is softer, if anything, in tone, although smelters offer with greater reserve than might be expected, considering the somewhat protracted period of dullness against which they have had to contend. Western is readily obtainable at 4.70¢ in carload lots, and bids of 4.65¢ have been solicited in a manner indicating that purchases could be made at that price.

Antimony.—There has been merely a routine movement and prices are still somewhat irregular. Hallett's is quoted at 12½¢, LX at 14½¢ @ 14½¢ and Cookson's at 15½¢ @ 15½¢, in wholesale quantities.

Tin Plates.—Orders to a fair aggregate amount have been placed for light weight (100 lb.) Coke-finish Plates for future delivery and some for full weights, the latter selling at a slight advance on spot prices and the former at about the same figures that are quoted for stock in store. Purchases were chiefly for canners and can makers. In Charcoals and Ternes there has been little doing, but large-sized Ternes are becoming scarce and comparatively few can be had now from outside sources at "under the market" prices. Spot business continues slow, and is chiefly of a quasi retail character. We quote: Coke Tins—Penlan grade,

IC, 14 x 20, \$5.25; J. B. grade, do., \$5.35; Bessemer do., \$5.30; Siemens Steel, \$5.45. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.70 @ \$5.75; Siemens Steel, IC basis, \$5.80 @ \$5.85; IX basis, \$6.85 @ \$7. IC Charcoals—Melyn grade, \$6.50; for each additional X add \$1.50; Allaway grade, \$5.80; Grange grade, \$5.90 @ \$5.95; for each additional X add \$1.10.—Charcoal Ternes—Worcester, 14 x 20, \$5.75; do., 20 x 28, \$11.50; M. F., 14 x 20, \$7.45; do., 20 x 28, \$15; Dean, 14 x 20, scarce; do., 20 x 28, \$10.60; D. R. D. grade, 14 x 20, \$5.25; do., 20 x 28, \$10.10; Mansel, 14 x 20, \$5.40; do., 20 x 28, \$10.30; Alyn, 14 x 20, \$5.45; do., 20 x 28, \$10.50; Dyffryn, 14 x 20, scarce; do., 20 x 28, \$11.10. Wasters—S. T. P. grade, 14 x 20, \$5.10; do., 20 x 28, \$10; Abercarne grade, 14 x 20, scarce; do., 20 x 28, \$9.75.

Coal Market.

The condition of the Anthracite Coal trade is peculiar, there being no prices that are quotable. Otherwise stated it is a buyers' market, as the buyer by "shopping" may practically dictate what he will pay. Companies and individuals alike are open for bargains, but the latter have somewhat the advantage, at a range 5¢ @ 10¢ per ton for the different sizes. The former are conveniently oblivious to the misdeeds of others in the trade, and each will secure a customer by concessions rather than let an opportunity slip. For example, there was a buyer who wanted, say, 15,000 tons of the different sizes, and found that some were long and others were short in their supplies and were the more or less anxious to sell, according to the stock on hand. As a whole the market is not overloaded, as the output of 2,000,000 tons agreed upon at the last meeting is adhered to and no Coal to speak of was mined either on Friday or Saturday. The aggregate production for 1891 exceeded 40,000,000 tons, the largest on record. The total amount of Anthracite Coal sent to market for the week ending December 26 was 624,610 tons, compared with 534,926 tons in the corresponding week of 1890, an increase of 89,684 tons. The total amount mined in 1891 to the above date was 39,813,362 tons, an increase of 4,375,569 tons. Notices of an indefinite suspension of work were posted at the Red Ash Collieries, Nos. 1 and 2, at Wilkesbarre.

From Wilkesbarre it is reported that the Lehigh and Wilkesbarre Coal Company are preparing to apply for an injunction restraining the Delaware and Hudson Company from further filling the Conyngham mine with water to extinguish the fire that has been burning for several months, fearing the pillars will be ruined and flood the Hohenbach mines adjoining. If any injunction is asked for and granted the great question at stake will be, how can the fire be extinguished?

In the Indiana Bituminous Coal fields the operators have agreed that hereafter they will have nothing to do with their men as an organization. Another strike is threatened.

An electric mining locomotive, made by the Edison General Electric Company, has been tested by the Loyal Hanna Coal Company of Pennsylvania. The contract called for a locomotive that would deliver 360 tons of Coal per hour at the shaft. To do this it had to haul 30 cars, weighing 1 ton each and carrying 3 tons of Coal, a distance of 4000 feet every 15 minutes. The capacity of the locomotive was found to be in excess of these requirements.

Freight rates in New York harbor are quoted at 65¢ @ 80¢ and discharge to Boston.

St. Louis.

OFFICE OF *The Iron Age*, 214 N. Sixth st.,
St. Louis, January 4, 1892.

Pig Iron.—The opening of the new year does not show any material change in the market. There seems to be a disposition, however, to investigate the market, and inquiries are quite numerous. Manufacturing establishments as a rule are pretty well fixed with Iron for the next six months. There are others, however, who have entered the year with comparatively small stocks on hand, and it is from this direction that inquiries emanate. The territory tributary to St. Louis is growing rapidly in manufacturing establishments, and a steady trade is enjoyed from these concerns. During the week under review sales were light and were for immediate use. Furnacemen are hopeful of a much better market during the present year than the one just closed. Everything is favorable to this end, and it is doubtful if the conditions which are generally supposed to govern the Iron trade to a certain extent were ever more favorable. A number of new enterprises are under way which will add materially to the consumptive capacity in this locality, and generally speaking the outlook is considerably brighter than it was 30 days ago. We quote as follows for cash, f.o.b. St. Louis:

Southern Coke, No. 1 Foundry,	\$15.25 @ \$15.50
Southern Coke, No. 2 Foundry,	14.25 @ 14.50
Southern Coke, No. 3 Foundry,	13.50 @ 13.75
Gray Forge.....	13.00 @ 13.25
Southern Charcoal, No. 1 Foundry.....	17.00 @ 17.50
Southern Charcoal, No. 2 Foundry.....	16.50 @ 16.75
Missouri Charcoal, No. 1 Foundry.....	15.50 @ 16.00
Missouri Charcoal, No. 2 Foundry.....	15.00 @ 15.50
Ohio Softeners.....	17.75 @ 18.75

Bar Iron.—Inquiries are at hand which point to renewed activity in this department. The year just closed has been a satisfactory one to the mills, as taking into consideration the low prices prevailing in other lines Bar Iron has held its own fairly well. Jobbers are busy and prices are well maintained. We quote as follows: Carload lots at East St. Louis, 1.70¢ @ 1.75¢; small lots from store, 1.85¢ @ 1.90¢, according to quantity.

Barb Wire.—No change to note. The demand is fair and prices as quoted herewith are strictly adhered to. We quote as follows: Painted, 2.70¢; Galvanized, 3.20¢; terms, 60 days, or 3 % discount for cash in ten days.

Wire Nails.—The sales of Wire Nails have been heavy during the past week, as it was thought that at prices ruling they were good purchase. Carload lots from mill are quoted at \$1.90 @ \$1.95. Jobbers quote \$2.10 for lots from store.

(By Telegraph.)

Metals.—The market is practically lifeless. A few car lots of Pig Lead have been sold during the past week, but prices remain as last quoted, at 4¢ bid and 4.05¢ asked for moderate sized quantities. Spelter is even more dull than Pig Lead. Consumers are taking absolutely no interest in the market, and price is purely nominal at 4.45¢. It is doubtful if sales could be made at even lower figures, as consumers are practically out of the market for the time being.

Old Alcalde Furnace, the property of the State of Texas, at Rusk, Texas, will probably go in blast on the 15th inst. The furnace was shut down on September 17 last in order to reline and make general repairs.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, January 6, 1892.

Warrants have undergone very little change. Dealings in Scotch have been small and chiefly at 47/; those in Cleveland moderate at an average of 38/ and Hematite fair at a decline to 48/. Outside interest is extremely tame and shows no reaction from holiday inactivity. Scotch Iron statistics show production last year, 674,425 tons, a decrease of 123,908 tons; exports, 313,613, decrease of 140,720 tons; stocks, 579,677, decrease of 33,768 tons. West Coast Hematite make decreased 119,900 tons, and East Coast 177,253 tons. Cleveland production ordinary Iron decreased 46,104 tons, but stocks increased 6654 tons. Falling off in production attributed to lowness of prices.

Pig Iron for prompt delivery advanced to 9/, selling at a premium over futures, owing, it is stated, to purchases by leading operators. Subsequent realizations by some holders caused a reaction of 5/. Statistics show an increase of 654 tons in visible supply and 603 tons in stocks here. Straits shipments hence last month were 2000 tons.

In price of Merchant Bar Copper there has been a rise to £47. 7/6 for prompt delivery, followed by reaction of about 15/. The stronger tone and advance in price were due partly to speculative buying, some of which is said to have been for account of a French clique, but good consumptive demand helped the market. The decline during the last few days was due to somewhat heavy realizations by speculative holders. Sales of furnace material during the past fortnight include 200 tons Montana Matte at 9/ per unit. Visible supply decreased 29 tons, and spot stocks 549 tons last month.

There has been more inquiry for Tin Plate, chiefly from San Francisco, without much actual business resulting. Ternes and lower grade Charcoals are in rather better request.

Scotch Pig Iron.—Demand for makers' brands continues moderate and prices still lean in buyers' favor.

No. 1 Coltness, f.o.b. Glasgow.....	56/6
No. 1 Summerlee, " ".....	53/6
No. 1 Gartsherrie, " ".....	54/
No. 1 Langloan, " ".....	54/6
No. 1 Carnbroe, " ".....	48/6
No. 1 Shotts, " at Leith.....	55/6
No. 1 Glengarnock, " Ardrossan.....	55/
No. 1 Dalmellington, " ".....	49/
No. 1 Eglinton, " ".....	49/

Steamer freights, Glasgow to New York, 1/; Liverpool to New York, 7/6.

Cleveland Pig.—There is no change in the character of business and makers' price remains at 38/, f.o.b., for No. 3 Middlesborough.

Bessemer Pig.—Business has been somewhat brisker, and the market is steady at 48/6 for West Coast Brands, Nos. 1, 2 and 3, f.o.b. shipping port.

Spiegeleisen.—The market remains quiet and unchanged. English 20 % quoted at 84/ @ 85/, f.o.b. shipping port.

Steel Rails.—There is more demand and the market is steadier, without change

in prices. Heavy sections quoted £4. 2/6 and light sections £5 @ £6, f.o.b. at N. W. England shipping point.

Steel Blooms.—A very quiet market, with makers still quoting £4 for 7 x 7, f.o.b., at N. W. England shipping point.

Steel Billets.—Dealing are moderate and former prices are asked. Bessemer, 2½ x 2½ inches, quoted at £4. 5/, f.o.b. at N. W. England shipping point.

Steel Slabs.—The market remains quiet and unchanged. Bessemer quoted at £4. 5/, f.o.b. at N. W. England shipping point.

Old Iron Rails.—Prices are unchanged and the demand is tame. Tees quoted at £2. 17/6 @ £2. 18/3 and Double Heads £3 @ £3. 2/6, f.o.b.

Scrap Iron.—There is little doing and no change in prices. Heavy Wrought Iron quoted at £2. 10/ @ £2. 12/6, f.o.b.

Crop Ends.—Small sales at unchanged prices. Bessemer quoted at £2. 12/6 @ £2. 15/, f.o.b.

Tin Plate.—The market is without change; demand only fair. We quote, f.o.b. Liverpool:

IC Charcoal, Alloway grade.....	14/3 @ 14/9
IC Bessemer Steel, Coke finish.....	@ 13/
IC Siemens " ".....	@ 13/3
IC Coke, B. V. grade.....	@ 12/9
Charcoal Ternes, Dean grade.....	@ 12/3

Manufactured Iron.—There has been no change in demand or in prices. We quote, f.o.b. Liverpool:

Staff. Ordinary Marked Bars	£ s. d.	£ s. d.
" Common ".....	8 10 0 @	6 15 0
Staff. B'l'k Sheet, singles.....	7 17 6 @	
Welsh Bars (f.o.b. Wales).....	5 12 6 @	

Pig Tin.—Market closes barely steady and quiet at £90. 12/6 for spot and £90. 12/6, three months.

Copper.—Business firm, prices somewhat irregular. G. M. B. quoted at £46. 2/6 for spot, £46. 15/, three months, and best selected at £50. 10/.

Lead.—The market remains very quiet, but steady, at £11. 5/ for Soft Spanish.

Spelter.—Market steady, but quiet, at £22. 12/6 for ordinary Silesian.

Imports.

Hardware, Machinery, &c.

Aich, H., Cooking Pots, 53	
Baker, Hermann & Co., Arms, cs., 4	
Bethlehem Iron Co., Mach'y, cs., 15	
Botany Worsted Mills, Mach'y, cs., 6	
Downing, R. F. & Co., Chains, cks., 5; Iron Chains, cks., 20; Mach'y, cs., 27	
Electric Cutlery Co., Mdse., cs., 6	
Field, Alfred & Co., Mdse., cs., 4; Gun Parts, cs., 6	
Graef Cutlery Co., Cutlery, cs., 5	
Hormann, Schutte & Co., Hdw., cs., 2	
Hammacher, Schlemmer & Co., Ironware, cs., 2; Nails, cs., 114	
Henderson Bros., Mach'y, pcs., 13	
Hertlein & Schlatter, Mach'y, cs., 17	
Kraft, W. B. & Co., Mach'y, cs., 14	
Kursheedt Mfg. Co., Mach'y, pcs., 10	
Lau, J. H. & Co., Cutlery, cs., 7	
Muller, E. & Co., Mach'y, cse., 1	
Nufer, Adrian, Mach'y, pcs., 8	
Oceanic Dispatch, Mach'y, pcs., 67	
Werlemann, H., Arms, cs., 5	
Ward, Jas. E. & Co., Ironware, cs., 5	
Wiebusch & Hilger, Gun Parts, cs., 11	
Witte, John G. & Bro., Hdw., cse., 1	
Order.—Mach'y, pcs., 67; do. cs., 17	

The Van Dorn Iron Works Company of Cleveland are building for the county of Tazewell, Ill., Pekin county seat, a large

county jail with sheriff's residence, and at the present time are busily engaged on iron work, such as stairs, elevator inclosures, beams, girders and other ornamental and structural iron work for two large buildings in Pittsburgh, which are the Germania Bank and Vandergrift buildings.

Manufacture of Sword Bayonets.

The complaints of defective sword bayonets three or four years ago, heard in the English War Office, induced the government to give a trial order to the firm of Sanderson & Co., who have erected extensive works at Sheffield and are producing bayonets said to be of the highest quality.

A brief statement from an English newspaper of the process of manufacture will be interesting. In the first place the steel is subjected to very strict analysis. It is rolled straight from the ingot into bayonet shape, and the bars are then put through the milling machines, which are beautifully constructed to insure extreme accuracy. Grinding is the next process, and this is done at a grinding wheel of a special pattern, worked automatically and carefully screened from prying eyes. The blades are next hardened in a special manner. Afterward they go through various finishing processes, and finally find their way into a workshop for government inspection. The government tests are of the most stringent character, and are carried out by three viewers, who hold their appointment direct from the war office. They are, in fact, masters of the situation. Some idea of the severity of the tests imposed will be gathered when it is stated that from 50 to 100 gauges are required in the various processes before the finished weapon receives the official mark of the viewers. The tests for strength and ductility include blows equal to 180 pounds, and a bending strain of 200 pounds. The bayonet is bent until it is shortened an inch, and must then recover itself under a weight of at least 200 pounds. About 100 men are employed.

N. S. Bartlett & Co. have removed their office to the Telephone Building, 125 Milk street, Boston.

A. J. Milne & Co., Iron and Steel merchants, of No. 1 Broadway, and 8 Oliver street, Boston, announce that James K. Hoyt, who has for ten years filled a confidential position with Jere. Abbott & Co., has been admitted as a partner in the firm.

H. H. Adams & Co., Pig-Iron merchants, have removed from the Union Trust Building to 177 Broadway.

At a practical working demonstration of the Thowless process of making metallic sodium and pure aluminum, given last Tuesday at the works of the Thowless Aluminum Syndicate, in Newark, N. J., Mr. Thowless stated that with a larger plant embodying the latest improvements he could place pure aluminum on the market at 50 cents per pound, and perhaps less.

Tests were recently made on the New York, Providence and Boston and the Boston and Albany railroads of a compound locomotive built for fast express service by the Rhode Island Locomotive Works. An ordinary locomotive was selected to run in competition with the compound. The results showed an advantage in fuel economy with the compound of 22½ per cent. on the average.

HARDWARE.

Condition of Trade.

THERE HAS BEEN as yet scarcely time for much change in the market since the opening of the new year and the situation remains substantially as at our last report. Manufacturers and jobbers, having for the most part completed inventories and closed up last year's business, are now moving actively toward the marketing of their goods. Some travelers are already out and many are soon to enter the field. There has been little change in the tone of the market in the matter of prices, and very few new lists or revised discount sheets have been issued. The trade generally are anticipating a prosperous season, but as their expectations in regard to business have recently been in a measure disappointed they are pursuing a conservative course and are not disposed to order with more than their usual freedom, awaiting some definite indication as to the coming of the large volume of trade anticipated.

Chicago.

(By Telegraph.)

Jobbers in Hardware report a quiet condition of trade so far. The traveling salesmen are not yet on the road, but are just starting out this week. They have given their houses very encouraging reports as to prospects for this year. On the other hand, the members of several firms are quite generally looking forward to higher prices as well as a larger volume of business, and are impressing upon their salesmen the desirability of firmness at this juncture. Prices show but little change. Staple goods are about as they have been. Seamless Brass Tubes have taken a plunge with the disruption of the combination, and are now selling at 5 cents off the list. Domestic Bright Tin Plate is being sold here, but only to the smaller trade. Numerous orders have been secured on the regular \$7.25 basis. The agitation for net prices seems to be bearing fruit. Jobbers have received circulars from a few manufacturers who have made the change.

St. Louis.

(By Telegraph.)

The Hardware trade is now going through an experience that is a yearly occurrence. Inventories are just being completed and salesmen are returning to their different fields of labor, so that trade is practically dormant. The winter weather, accompanied by snow, which set in about the first of the year, has caused an active local demand for Sleds, Skates, &c. The movement in the latter is slow, however, and prices at which they are offered leave but little margin for

the jobber. A large demand is experienced for Wire Nails, which are as low as they can possibly go. An early advance is anticipated both in Wire and Cut Nails. Jobbers are satisfied with their last year's trade and are making preparations to increase it considerably during the present year.

Baltimore.

CARLIN & FULTON.—While probably the purpose of these bi-weekly letters is rather to give a report of the present condition of trade than a review of the past, yet at the beginning of the year it may perhaps be well to look backward in order that we may forecast the future, as well as account for the present. We can all remember the widespread feeling of distrust and uneasiness which one year ago prevailed everywhere, and the stringent money market which followed the Baring failure. The cotton crop of 1890 was largely unsold at the beginning of last year, and the price had dropped below the cost of production, but in spite of this fact preparations were made for another crop upon an acreage equal to, if not larger than, that of the year before. Values of real estate throughout large sections of the country had been "boomed" and inflated until stubble fields were held at higher prices than city lots, and the tight money market found speculation at its height, projecting at every railroad station or county seat a future city, with factories, mills and furnaces, schools and colleges, machine shops and foundries; and everything that comes to a metropolis in the course of years was expected or at least promised to spring at once into existence as if by magic.

One year ago the political sky was clouded with the untried theories of the Farmer's Alliance, the sub-treasury schemes, free silver coinage and the uncertainties as to the effects of the new tariff. A year has now passed, and to-day we see the price of cotton lower than it has been for 50 years, discouraging the planter and deadening business to a very great extent throughout the South and putting to a crucial test the ability of many to weather the storm. It is fortunate that business throughout that section has been adjusting itself to just this condition of affairs, and that conservatism in both buying and selling has prevented any general disaster. "Sweet are the uses of adversity," and perhaps now the South will appreciate the truth that there is a limit to the consumption of any one staple and will be induced to diversify its crops, or at least reduce its acreage of cotton. We are glad to read that a convention of representative men from the cotton States has been called to meet this month at Augusta to discuss this very question. Throughout the grain sections of our market the country has not only been blessed with excellent wheat and

corn crops but has enjoyed fairly satisfactory prices for them, and though the elevators at the seaboard cities are crowded with grain, there are large quantities in the barns of the farmers unsold and held for higher prices.

The total failure of the fruit crop of 1890 can be contrasted with the immense yield of the year just ended, and even if the prices have not been all that could be desired, yet the money expended in gathering and shipping it has been large and gone into circulation, and every one has had the advantage of having at a low cost what had been previously a luxury in food.

We have seen a decided reaction from the exaggerated values of real estate in the "boomed" towns, and now the development will be that based on natural advantages alone, and a necessity for the existence of such enterprises as may be projected.

Contrasting most decidedly with the situation one year ago is the condition of the money market, for in all the larger cities and financial centers money is easy and the bank reserves largely in excess of the law's requirements. We regret, however, that we cannot say this in regard to the South, where the greatest stringency prevails.

Upon the whole the year promises well, but as yet trade has not felt the stimulus to activity which the situation should give. Manufactured goods generally have never been lower and the heavy staples are at undoubtedly unprofitable prices. Only where dull sales and ruinous competition have driven the manufacturers to united action have there been advances in prices, but when we consider that stocks in the hands of the retail trade are almost universally low, and the immense sums of money which the crops now being marketed will put into circulation, and that the indebtedness of the consumer has been diminishing for the past year, we are inclined to the belief that a revival in business is not far distant, and the demand for goods from all over the country will be great enough to give a reasonable excuse for advances in prices which will undoubtedly follow.

New Orleans.

A. BALDWIN & Co., LIMITED.—There is little change in the situation of the country since our last report. Most of the traveling men being at home, it has a tendency to make the situation much duller than justified by the actual facts. Of course the usual quietness prevails during the holidays, but we think from the indications to-day that there will be considerable of an improvement in the next 60 days. The unsatisfactory prices for the crops still have the effect of making buyers curtail their purchases to their actual wants. The demand for Staples, such as Nails and Barb Wire, is showing

a decided improvement as the new year opens. Most buyers seem to think that the bottom has been reached in articles of this class and they are beginning to stock up in anticipation of an advance shortly.

Philadelphia.

SUPPLER HARDWARE COMPANY.—Since the date of our last letter we have passed through the holiday season, and the year 1891 has been recorded in history as remarkable in many particulars. During the last two weeks of the year the only noticeable activity with any of the wholesale houses has been the usual yearly activity incident to taking account of stock, which all are anxious to have completed by January 1, after which, however, the pricing, footing and extension takes it further into the month, but all prudent business houses admit that it is a work well expended to thus ascertain the results of their labors and the condition of their business. It is unfortunate that all the retail houses in the country do not feel the same importance of this matter and do not adopt it as an iron-clad rule, for it is a well-known fact that too many of them grope along in the dark from year to year, and are frequently surprised when they find themselves in hot water. The last ten days of the year is always a period of dullness, so far as orders are concerned. Salesmen, as a rule, are off the road, either at their homes or else revising samples for the next campaign, consequently there is nothing but mail orders to interfere with the usual annual stock taking.

The year of 1891 has, in many respects, been remarkable, as well as singularly unusual. The Eastern Coast jobbers have all endeavored to at least retain the volume of their 1890 trade, which, in volume, unquestionably exceeded that of any preceding year. This desire at times caused needless and unwise softening in prices. When the year 1891 opened the stock of goods in hands of retail merchants throughout the country was in a fair condition, unusually well assorted and fairly large, and, as there was nothing in view which indicated any stiffening in prices, there was no speculative disposition or tendency to induce orders, but purchases were made on weekly or monthly requirements. This state of affairs existed during the first six months of the year, but the entire year was one of especially conservative purchasing.

From present appearances, it is quite doubtful about the year 1892 being equally uneventful in this respect. However, we think, on the whole, the jobbing trade of our city has been in excess of 1889, and the volume of trade may be equal, although the profits may not foot up quite equal, to 1890, but balance sheets may show an agreeable surprise to many. The aggregate loss by failures for 1891 on trade tributary to Philadelphia exceeded that of 1890. The latter year, however, was especially free from any epidemical failures. The statistics for 1891 show that in the trade tributary to this city, the number of failures was in excess in proportion to the country as a whole, and our own State shows the number in excess of any former

year, and as far as liabilities are concerned, over 20 per cent. greater than any previous year. Experience shows that failures are not only frequently malignant, but contagious. There is something radically wrong (but it unfortunately exists) in a system where important measures are often influenced by personal or political aspirations of would-be party leaders. Besides this, occasional laws which are enacted in the halls of legislature, we regret to say, look as though, when framed, many voters were within the sound of the cracking of the party whip.

In our letter of November 5, we designated failures under five different headings:

1. Continued depression of trade.
2. Excess of borrowed money in starting business.
3. Money withdrawn from business for outside purposes.
4. Extravagance beyond profits.
5. Lack of business honesty and integrity.

A sixth heading might well be added—lack of business capacity and prudence.

The year 1891 shows a fair number, who have succumbed to that most excusable of all failures—viz., continued business depression of trade. An occasional few can be found in the second, third, fourth and sixth classes, but we regret to see so many can be traced to the fifth class.

In cases of this kind, our State laws permitting, as they do, unjust preferences to any one or more persons, frequently leaves the balance of their indebtedness to the other creditors totally uncollectible, and, unfortunately, instances are not rare where the heavy unprotected creditors have been deceived into extended leniency, thus giving the debtor an easy opportunity to fill his pocketbook before making his preferences. In the failures under the first heading especially, a statement is usually furnished without delay by the debtor and he usually has the sympathy and assistance of the creditors. Greater difficulty is necessary usually to receive a statement from debtors of the second, third and fourth class. The sixth class usually ask for advice and assistance, which is generally secured, but the fifth class, which is of a malignant type, cancerous in its growth, usually ends in the death of reputation of the debtor and contempt of the community. Just State laws could correct this existing evil in this class of failures, and all honest dealers are alike interested in having State laws for the collection of debts which are just to the debtor and creditor alike.

The year 1892 opens with more than the usual hopeful outlook; the only present visible cloud being the Presidential election, which year is usually looked upon as temporarily affecting trade; other than that, there is a general feeling of confidence. The coast cities have not, to any great extent, felt the beneficial results of our unprecedentedly rich harvests other than indirectly. The large amount of indebtedness which has been paid off in the shape of farm mortgages has been

largely held in the East, the payment of which has brought money into the vaults of corporations, trust companies and capitalists, which must naturally be reinvested, much of which will ultimately find its way into development of new enterprises. In some portions of the South proposed enterprises, some partially completed, have been for the last few months comparatively dormant, but are likely to start with renewed energy and vigor when additional capital can be secured.

The country is rich in agricultural products, which is equal to cash, for both home and foreign markets. These are bringing fair prices, and are being shipped as fast as railroad facilities will permit. The cotton crop is large, although, unfortunately, the low prices have prevented heavy export shipments which otherwise would have been made, consequently large quantities remain unsold, and we learn from our customers in the South that nearly every warehouse is full of cotton, held by first or second hands for better prices. This must eventually be the means of money flowing into the hands of merchants, who have been put to considerable inconvenience owing to tardy shipments. The Iron industries of our State are likely to improve, and quite probably be in a flourishing condition for some time to come, as large orders have already been placed for Iron Rails, rolling stock, &c. Our merchandise exports have increased and at present continue in excess of one year ago, while imports have fallen off, in many instances from the fact that some goods formerly imported are now supplanted by home products, and enterprises are now being developed in our own city. The currency is at its highest maximum point, and experienced financiers express their opinion that it is quite equal to the extraordinary requirements for both moving crops and improving trade.

At this date fewer changes in prices of Hardware have reached us than is usual the first of the year. This may be looked upon as an indication that Hardware has about reached the minimum point.

St. Paul.

FARWELL, OZMUN, KIRK & Co.—There is nothing special to report at this date. Travelers are all at home, jobbers are busy taking stock and there is but little trade. During January and February the Hardware trade is unusually light, and it is not expected to open in good earnest until March. This winter will probably not be a notable exception to the rule, and the next 60 days will be largely employed in getting ready for the heavy trade that is expected in the spring.

There is no material change in the situation as to prospects for the spring trade. All jobbers expect it to be healthy, as the conditions generally favor this view, but there have been so many disappointments in the past and there are so many possible hindrances that might prevent a full realization of the present favorable prospects that the conservative business men will not be led into making such an effort for the extension of their business as might

cause them hearty regret if the crops of the coming year should not prove at all satisfactory.

Unfortunately, there is a large line of customers in the Northwest that must rely on jobbers to carry them through the summer months, and this class must, necessarily, be handled with great care. The number of such customers is yearly growing less, but it is still large, and the instances have not been infrequent in the past years of poor crops in the Dakotas of jobbers being compelled to carry a considerable number of such customers over into the following year. The past year's large crops have helped greatly to put these accounts into good shape and the conservative wholesale houses have profited by their experience and will not load up heavily with this class of trade.

Portland, Ore.

FOSTER & ROBERTSON.—While the almost continual rainfall for the past three months in the territory lying west of the Cascade Mountains, and the immense body of snow east of the mountains, give promise of most abundant crops for the coming year, and logically a prosperous business year, yet these favorable conditions for the future have been purchased at a sacrifice to the present year's business, as shown by the decreased volume of business for October, November and December, owing to the unusual interruption of outdoor work. The volume of business for the year with most of the jobbing trade will not fall very much short of previous years, but in the matter of profits the results are not regarded as entirely satisfactory. Prices remain about as heretofore, except a slight decline in the price of Nails, which are now held at \$2.75 base for Steel Cut and \$3.15 for Steel Wire.

Cleveland.

THE W. BINGHAM COMPANY.—Inventory time has come and there is little else thought of now. Every one is taking account of the last year's business, and the regular routine is almost abandoned. Until the smoke of battle clears away and results are known there will be little to report.

Louisville.

W. B. BELKNAP & Co.—Although the old year has but just expired, there are certain signs of animation which are most encouraging. Quite a little buying movement has set in, seeming to justify the several advances already announced by the manufacturers.

That goods have been abnormally low is conceded by every one, as well as the fact that we have failed so far to reap any great benefit in trade from the acknowledged large crops and general improved condition of the agricultural districts. The only exception to this improvement may be in some parts of the South, where the crop of cotton was not large, and where the returns are at the low price of the general market.

Among the considerable advances may be mentioned that of Galvanized Iron, Rope, Screws and Curry Combs. We look for more to follow.

Locally, while there have been some bad failures during the past year in the general process of liquidation, most of the financial institutions are paying their regular dividends, some of them larger dividends than before. It is with this as in any other business, a matter of management. Those who have been prudently cared for are having good balance sheets to show the stockholders.

San Francisco.

HUNTINGTON-HOPKINS COMPANY.—The market continues quiet, with no very important features, although competition is becoming sharper and more animated. The outlook as to volume of trade during 1892 is good.

Boston.

BIGELOW & DOWSE.—It is too early to know the exact result of the past year's business, but it is safe to say the hopes of increased business during the fall months have not been realized. The whole trade have been very conservative in their buying and there are no large stocks on hand. The spring purchases must necessarily be large, and unless all signs fail the coming season is full of promise. The recent advance in Steel Billets is a straw which shows which way the wind blows. All the trade seems to have had timely notice from the manufacturers of the anticipated advance in the price of Screws, and those who had no faith in the advance are seeking to replenish their stocks from the jobbers, who find it to their advantage to take care of their friends. It is the same on all lines of goods, each house has a clientele that looks to it for protection; they do not care to buy until an advance actually takes place; then they are anxious to place their orders, and the jobber who has not the foresight to not only take care of himself but his customers also is not likely to be materially benefited. Cordage has again advanced 1 cent a pound, which does not decrease the demand. Strap and T Hinges are again advanced and prices are well maintained. There is a good inquiry for Wire Nails, and many are taking advantage of the extreme low prices to place their spring orders. The strong competition in the Barbed Wire market keeps prices down and no one seems inclined to buy early, and unless the Columbia Patent Company are successful in their suit against infringers and settle their difficulties with the W. & M. Mfg. Company it would seem as if low prices would rule in the East for some time to come.

Notes on Prices.

Cut Nails.—During the past broken week the market has developed no new features nor any change in the tone, not especially strong, which has characterized it for some time. There has been, however, no further weakening, and prices are well maintained. The demand is sluggish and buyers are not in haste to place their orders, although acknowledging the possibility that with the improvement in business, which is anticipated, there may be

before long some strengthening of prices. Quotations are on the basis of \$1.45 for round lots, at mill, though concessions are sometimes made on particularly desirable orders. New York quotations are \$1.55 to \$1.60, on dock, the price for small lots from store being \$1.65 to \$1.75.

Chicago, by Telegraph.—Manufacturers' agents report a moderate volume of business at \$1.62½ to \$1.65 for Steel Cut Nails, 30-cent average. Jobbers' prices are \$1.70 to \$1.75.

Wire Nails.—The quotation remains as at our last report, \$1.65 for carload lots of Wire Nails at mill, though it is intimated that this figure can be slightly shaded on desirable orders. The volume of business is not heavy. The trade are watching the market closely, looking for the first indications of the advance which they regard as likely to take place in these goods, and some of the jobbers have already placed orders sufficient to cover their requirements for some time. The feeling that prices will soon be stronger than at present is not connected with any anticipation that the manufacturers will be able to come together with a view to controlling the market, as it is generally regarded that there are insuperable obstacles in the way of effecting such an arrangement.

Chicago, by Telegraph.—Wire Nails are quoted by manufacturers' agents at \$1.80, Chicago, with a moderate volume of business. Jobbers name \$1.90 to \$2.

Barb Wire.—The principal fact to be noticed is the change of the name of the Columbia Patent Company to Columbia Wire Company, without, however, the announcement of any changes in price or policy. There is also a slight improvement in the demand.

Chicago, by Telegraph.—The name of the Columbia Patent Company has now been changed to Columbia Wire Company. No change has been made in any other way, but matters of importance to the trade are pending. If outside establishments do not combine with the Columbia Company there is some probability that they may nearly all if not quite all be united in an organization which will closely co-operate with the Columbia. The manufacturers report business coming lively, orders are numerous and prompt shipments are being called for. Painted is quoted \$2.65 in small lots and \$2.55 in carloads at Chicago or Joliet. Galvanized, 50 cents per 100 advance.

Screws.—The advance in the price of Wood Screws which we announced in our last issue has since been announced by the different manufacturers in their own circulars. In connection with the change of discount there is also a disposition on the part of manufacturers to give extra discounts less freely than heretofore, and the market in this line is, on the whole, in a very satisfactory condition. As representing the present prices on a very complete line of Screws we give the following discounts, taken from discount sheet of

in an Ohio penitentiary; and that they did not bear the stamp or mark required by laws of Ohio. They call our attention to affidavits, which show that John C. Kupferle of St. Louis, Mo., has made and is still making all the castings for the St. Joseph Pump Company for the Perfection Water Elevator and Purifying Pump; that no castings have been purchased by the St. Joseph Pump Company from the Ohio penitentiary; and that the pump company has never employed convict labor at their shops in St. Joseph, Mo., or anywhere else in the manufacture of any part of their pumps. The St. Joseph Pump Company have spared no pains to prove the falsity of these statements, as they considered the misrepresentation as designed to injure their business.

PULLMAN SASH BALANCE COMPANY, Rochester, N. Y., illustrate their Balance in the advertisement which appears on another page, explaining its construction and alluding to its excellence.

CYRUS REIMER, Owosso, Mich., who recently purchased the Hardware store of C. J. Stuart, has materially altered the establishment, the arrangement of which is now referred to as very attractive and skillful.

OUR READERS will doubtless observe the two-page advertisement printed on enameled paper, in which E. C. Stearns & Co., Syracuse, N. Y., call attention to four of their leading manufactures. The special features and advantages connected with their Improved Warner Single Track Parlor Door Hanger, the Stearns Lawn Mower, Stearns' Unbreakable Steel-Spring Hinge and the Matchless Hold-Back Spring Hinge are thus illustrated and described.

J. J. TEEPLE, who has been with Russell & Erwin Mfg. Company, New York, for the past 12 years, has become associated with Van Wagoner & Williams Company, 82 Beekman street, New York, who are about completing a very fine plant at Cleveland, Ohio. Mr. Teeple, who has a large acquaintance throughout New York State and that portion of Pennsylvania formerly covered by him as a representative of Russell & Erwin Mfg. Company, will represent Van Wagoner & Williams Company in all cities east of Buffalo and Pittsburgh and in the South, and trusts that he may have in his new connection the continuance of the courtesies always extended to him.

TROY NICKEL WORKS, Troy, N. Y., in their page advertisement in this issue call attention to their patented Alaska Stove Trimmings, which they refer to as always cold. Illustrations are given showing a variety of their Alaska goods.

LUFKIN RULE COMPANY, Cleveland, Ohio, announce the removal on January 5 of their entire plant and main offices to Saginaw, Mich., where they have erected new buildings suitable for their increasing business. The buildings are constructed after the latest and most approved plans of factory architecture, having good light, first-class sanitary arrangements, and are of substantial construction. They will operate their own plant for lighting by electricity, and the buildings will be heated and ventilated by the Sturtevant hot blast system. They will take with them all heads of departments and their most competent workmen; and will increase their force considerably, owing to their larger buildings and greater facilities. The selection of their new location is the result of a most thorough investigation as to the advantages of the various sites offered, and, after careful consideration, they decided that their best interests and those of their customers lay in their final decision. They state that with their increased capacity, and with a factory built and arranged for

their particular business, in a more cleanly and healthy location, they will be able to serve their customers with greater promptness and produce better goods than ever before.

UNDER DATE of January 1, 1892, the trade is notified that the firm of Merwin, Hulbert & Co., New York, have been dissolved by mutual consent, either Milan Hulbert or William A. Hulbert, who comprised the firm, signing in liquidation. The business will be continued under the name of Hulbert Bros. & Co. by Milan Hulbert, Wm. A. Hulbert and Milan H. Hulbert.

THE STEEL HINGES AND BUTTS put on the market by McKinney Mfg. Company, Allegheny, Pa., are strikingly brought to the attention of the trade in the company's advertisement on another page, and the excellence of the goods referred to. The company also in the same connection courteously tender the trade their best wishes for the new year.

WE ARE ADVISED that the Van Wagoner & Williams Company, 82 Beekman street, New York, have recently purchased the Trenton Vise and Tool Works, Trenton, N. J., and have moved the machinery to Cleveland, Ohio, so that they hope soon to be in a position to offer to the trade a complete line of Picks, Hammers, Sledges, &c., in addition to their well-known line Spring Hinges and Coat and Hat Hooks.

GORHAM HARDWARE COMPANY, Jackson, Tenn., announce that on and after January 1, 1892, the style of their firm will be the Jackson Hardware Company. No other changes are made, and the management of the firm will continue practically the same as heretofore.

CALDWELL MFG. COMPANY, Rochester, N. Y., for whom the Reading Hardware Company are agents, New York, Philadelphia and Chicago, in an advertisement elsewhere in this issue illustrate their Caldwell Sash Balance with Aluminum Bronze Tape and Oil Tempered Steel Spring. They also refer to the fact that they have recently made alterations and extensions in their works necessitated by the large increase in the demands of the trade during the past year. The office department of the company has undergone important changes, having been newly fitted and arranged for convenience in meeting the requirements of an enlarged business.

JOHN BRAUN AND SUPPLEE HARDWARE COMPANY issue a joint circular, dated Philadelphia, December 31, 1891, in which they refer to the fact that some Lawn Mowers have been and are still being manufactured and sold which their attorneys advise them infringe upon their exclusive rights under patent issued to John Braun, No. 208,788, October 8, 1878, and stating that they intend to protect their rights. For the information of manufacturers of and dealers in Lawn Mowers they give a copy of the eighth claim of the above patent and caution both manufacturers and dealers against further infringement. The extract given from patent is as follows:

The rotary cutter K consists of a blade a', projecting from the solid stock a'', which is an enlarged continuation of the blade, whereby a large surface and strong piece are provided, for the attachment of the cutter to the supporting lugs or arms. The blade portion a' projects from the stock to such extent that the cutting edge may be readily sharpened without sharpening the thickness of the stock, thus saving time and material. The cutter consisting of the blade a', projecting from the enlarged stock a'', substantially as and for the purpose set forth.

THE AGENCY FOR THE NORWICH LOCK MFG. COMPANY, formerly of Norwich, Conn., but now of Roanoke, Va., is now held by the Alford & Berkele Company of 77 Chambers street, New York, who will

hereafter represent the large variety of Builders' Hardware put on the market by this company. The Alford & Berkele Company are now also exclusive agents for the Ellrich Hardware Mfg. Company of Plantsville, Conn., makers of Screw Drivers, Saw Sets, Wrenches, &c.

FRED. D. STELLWAGEN, who for nearly 14 years was with Sargent & Co., New York, has been appointed manager of the New York house of Reading Hardware Company, 81 Reade street, succeeding W. Fetter, Jr., who for four years has occupied the position of manager and retires to engage in other business.

JOHN CHATILLON & SONS, 85 Cliff street, New York, advise us that while the loss from the disastrous fire in their factory on the 23d ult. is much more serious than at first anticipated, they are able, after ten days' diligent work, to inform their friends and patrons that they are now in a position to fill promptly all orders entrusted to them.

C. M. AVERY, whose resignation as representative of the Enterprise Mfg. Company, Philadelphia, we announced some time ago, has completed arrangements by which he will hereafter represent Wm. J. Lloyd Mfg. Company, Philadelphia; Pike Mfg. Company, Pike Station, N. H.; Cleveland Foundry Company, Cleveland, Ohio; W. G. Avery Mfg. Company, Cleveland, Ohio, and the Barnes Mfg. Company, New Haven, Conn. Mr. Avery is well and favorably known to the Hardware jobbers in the East and West and will visit the same trade he has called upon heretofore.

SAMUEL DUDLEY, New London, Conn., issues advertising card 14 x 22 inches in size, which is arranged for the benefit of Carriage and Wagon manufacturers, Blacksmiths, &c. Besides having illustrations of Carriage Goods, tables are given showing the weight of the different sizes of common Axles; elliptic and side Springs; Steel Tire per set; Iron per foot; also a price-list of Norway Carriage Bolts with the discount figured at 50, 60, 70 and 75 per cent.

ANNOUNCEMENT IS MADE that the firm of Brown, Johnston & Co., Roanoke, Va., has been dissolved by limitation. Having purchased the interest of A. R. Bowdre in the firm, F. W. Brown and N. B. Johnston will continue the Hardware business at the old stand under the firm name of Brown & Johnston.

Calendars.

THE NUBIAN IRON ENAMEL COMPANY of Cragin, Ill., are distributing their daily memorandum calendar for the first quarter of 1892. Manager Bonnell says that he hesitated for some time before making arrangements for continuing the calendar for another year, but was almost forced to do so by the applications he received for it. The applicants doubtless wanted to read his original remarks, printed for perusal on each daily slip. If the calendar were dropped these remarks would certainly be missed by the constituency which Mr. Bonnell so gracefully addresses every day.

NATIONAL HORSE NAIL COMPANY, Vergennes, Vt., send a Metallic End Hanger, with calendar sheets for 1892. At the top are cuts of Champlain Horse Nails, below which is a colored picture of the chariot race. Attention is directed to their hot-forged and cold-finished Nails, made from the best Swedish stock and warranted.

THE W. K. BOONE COMPANY, Lima, Ohio, send a quarter-century souvenir with their compliments to their customers, this covering the period from 1867 to 1892. To the left of the card is an engraving, the printed matter being to the right. Below are the calendar sheets for 1892.

MEADVILLE VISE COMPANY, Meadville, Pa., have prepared a calendar for 1892. A neat engraving occupies the upper center of the card, on each side of which are illustrations of Vises and Flexible Light Holders. Below are the calendar leaves.

F. E. MYERS & BRO., Ashland, Ohio, are sending out a metallic end hanger calendar for 1892, about 5 feet long, with illustrations of Pumps and Hay Tools. The calendar sheets are attached to the card about midway between the two ends.

S. CHENEY & SON, Manlius, N. Y., issue an 1892 calendar, representing a pen and ink sketch of a girl's head, and advertising the Diamond Stove Pipe Thimble. The calendar sheets are attached to the lower part of the card.

HENRY SEYMOUR CUTLERY COMPANY, Holyoke, Mass., Wiebusch & Hilger, agents, 84 and 86 Chambers street, New York: An 1892 Calendar. The card upon which the calendar sheets are fastened is a reproduction of the front cover of their new catalogue, having a dark background upon which are raised letters in gilt and bronze.

SAML. H. BLACKWELL, Fairfield, Maine, issues an 1892 calendar, the calendar sheets of which are in the lower right-hand corner. The rest of the card is taken up with a colored winter scene, representing a wind mill, landscape and team with bags of grain. In the lower left-hand corner is a list of goods handled and trade mark.

PIERCE HARDWARE COMPANY, Taunton, Mass., send a colored picture of the rocky sea shore, surrounding which is open scroll work. Above the water line the name of the firm is printed, below which are the suggestive words, "We sell as low as we like." The calendar leaves are attached to the bottom of the picture.

Among the Trade.

WE HAVE the following communication from a correspondent who has recently been making a trip in Tennessee and adjacent States in which he refers to the condition of things which he observed in some of the leading cities:

On a recent trip the writer visited Memphis, Tenn., Cairo, Ill., Paducah and Henderson, Ky., Evansville, Ind., and Owensboro, Ky., in succession named, and was struck by the remarkable variation in this short space of country in regard to status of general business, depending on the products of surrounding fields.

Memphis is one of the largest receiving and shipping ports of the South's great staple, cotton. Nearly every other sign in the wholesale streets has the old cognomen, "Cotton Factors." It is hard to imagine a more depressed state of affairs than at present exists in this great cotton region. The largest crop ever raised is thrown on the market, which is still suffering from overproduction of last season, and the quality of the present crop being many points above the ordinary grade, it should command ordinarily fine prices, but which really can't be forced off at 7 cents. This price of 7 cents per pound is now ruling, but all who can do so are holding back in hopes of some change for the better. Unfortunately, this beautiful and bountiful crop cannot find a demanding market abroad like the wheat of the West. It can't feed the hungry, and, unfortunately, it may prove unavailing to feed the hungry at home. The people who raised this big, fine crop are compelled to sacrifice it in order to buy the wherewithal to maintain themselves. This condition of things makes trade in the cotton belt very much depressed. And yet, in spite of this, some of the leading houses of Memphis are doing a very good business and are well satisfied, considering the

scarceness of available cash in this region. The wholesale grocery trade, which is of enormous proportions in Memphis, feel the depression much more, as nearly every house is also a cotton factor and has advanced to its customers on present crop in many cases more than the staple will bring unless some unforeseen factor will cause a reaction.

Coming up the great river to Cairo, Ill., at the junction of the Ohio, I found the Hardware trade remarkably good. We get out of the cotton region here, and strike the vast cornfields of the Ohio and Wabash valleys. A tremendous crop has been gathered through this rich country and commands 40 cents per bushel on the river bank at the cribs, whereas three years ago corn was a drug on the market at 26 cents per bushel. The farmers say it costs 27 cents to raise corn. Much of the grain is shipped direct down the Mississippi and there distributed, and a great deal finds its way through the South by shipment up the Tennessee and Kentucky

lines it lets the bigger cities further off come too much into its rightful territory.

A Letter.

STANLEY WORKS, New Britain, Conn., recently received a letter, reproduced herewith in *fac-simile*, which they refer to as illustrating the advantages of advertising, inasmuch as if they had not advertised these goods their correspondent would never have had an opportunity of attempting to decide whether or not they were "sailable."

Price-Lists, Circulars, &c.

R. E. DIETZ COMPANY, New York and Chicago: Standard Tubular Goods. A pamphlet entitled "Birth of a Great Industry," in which the right-hand pages are devoted to a review of Petroleum production, while the left-hand

Dear Sir
 Having seen
 your advertisement
 in the Trade Journal
 of the best henge in
 the world the
 Corrugated henge
 So I write you that
 you may send your
 sample and price list
 and if sailable I
 will Comendise the
 sail off yours
 Res^{pe}fully

The Stanley Works' Letter.

rivers, which empty into the Ohio at Paducah. This place is also enjoying, in connection with the corn crop, a bountiful harvest of excellent leaf tobacco. Prosperity reigns also at Henderson and Owensboro, Ky., and Evansville, Ind. The large crop of Burley tobacco through this country is bringing excellent prices and meeting ready purchases. At Henderson are located some of the largest stemmeries and shippers in this country. They even claim an equality with Louisville in the respect of foreign shipments. This latter place sold 150,000 hogsheds of last year's crop, and may have 200,000 on the breaks this year. Davies County, of which Owensboro is the county seat, has about seven of the finest and largest whisky distilleries in the state. These take large quantities of the corn crop, some of them consuming from 1000 to 15,000 bushels per day. All of this prosperity in the country makes prosperous merchants, and the Hardware dealers are not complaining of bad collections through this section.

Evansville is by far the largest city of Southern Indiana or on the lower Ohio, and is situated very advantageously, does a large general business, but in Hardware

pages show illustrations of Tubular Goods. The business of this company was established in 1840.

I. L. ELLWOOD MFG. COMPANY, De Kalb, Ill.: The Glidden Pocket Compendium, a volume of carefully selected facts, figures and information of value to all interested in the building or maintenance of fences, also setting forth the advantages resulting from the use of the genuine Glidden Steel Barb Wire Fencing.

SARGEANT MFG. COMPANY, Newark, N. J.: Illustrated Price-list No. 33. This is a book of 255 pages, devoted to Saddlery Hardware, Gig Saddles, Coach Pads, &c. In this list they continue the same arrangement of numbers as they adopted in their No. 30 list, the last two figures giving the size in eighths above 1 inch, the other figures denoting the number of the pattern.

W. W. LAWRENCE & CO., Pittsburgh, Pa.: A pamphlet entitled "The Best Paints and How to Use Them." Colored cards are shown of the Lawrence Paints, mixed ready for use, which Paints are described as strictly pure, containing no water or benzine. Suggestions are given, relating to choosing colors for outside work, so that the results may be pleasing,

and the colors harmonize with the surroundings. Directions are given for painting, rules for estimating the amount of Paint required for buildings and other information of like character.

S. CHENEY & SON, Manlius, N. Y.: The Perfection Oil and Molasses Gates, and the Diamond Thimble. Circulars referring to these goods give description and price-lists.

HENRY SEYMOUR CUTLERY COMPANY, Holyoke, Mass., Wiebusch & Hilger, agents, 84 and 86 Chambers street, New York: Shears, Scissors and Sheep Shears. Special care has been taken in the make up of this catalogue and price-list, both as to the typographical work and the cuts. A large variety of goods are shown in each line, making a desirable assortment from which to select. All of these goods are put in paper pockets, made of superior quality paper, each printed with an attractive label. This company are prepared to furnish Shears of various grades, under private brand, in lots of 50 to 100 dozen.

ROCKFORD BIT COMPANY, Kokomo, Ind.: Augers, Auger Bits, Boring Machine Augers, Car Bits and Screw Driver Bits. Their 1892 catalogue, the World's Fair Edition, is attractive in its arrangement, as well as in the manner in which the subject matter is presented. Referring to the Bit, they remark, that it is a pioneer among tools and is almost always successful in making its way through obstacles, and as with humanity, a good temper is a great aid to efficiency. Illustrations show Jennings' Pattern and Common Auger Bits in sets, in fancy wood boxes.

THE WILCOX & HOWE COMPANY, Birmingham, Conn.: Carriage Hardware. Their catalogue of 140 pages shows a neat arrangement of illustrations and prices of Clips, Couplings, Curtain Fastenings, Stump Joints, King Bolts, Reach Irons, Sockets, Step Pads, &c. Their line is very complete in this class of Carriage Goods. They have, they state, every facility for making steel and iron forgings of every description, and can furnish estimates for forgings of any description, for Carriages, Bicycles, Agricultural Implements or any purpose.

Trade Topics.

Neatness in the Store.—Many of our readers thoroughly appreciate the fact that a little inattention in a Hardware store will permit the incoming of a good deal of disorder, depriving the establishment of the neat and attractive appearance which it is so desirable should be maintained. On this general question we are in receipt of the following communication from a Hardwareman in Ohio:

That a Hardware store is not as easily kept clean and neat as a dry goods store goes without saying, but there is no reason why it should not be so, as it is not an impossibility by any means, and I can cite several instances that very ably prove the practicability of my assertion. It means work and lots of it, but your clerks will be none the worse for spending an hour at dusting or sweeping that otherwise might be consumed in discussing with their cronies the latest sporting news.

In the first place it is well to look around your store carefully to see if there cannot be some changes made in the arrangement of your stock that would improve the general appearance of the room. Most every one can find something of this kind to do, and there is no better time to do it than when you have things torn up for inventory. Quite likely you need some more showcases—most every Hardware merchant does—and you might have a case made in which to keep your Guns and Sporting Good, that would not cost much and would pay good returns for the money

invested. Indeed, most every merchant has the name of some carpenter or cabinet maker on his books from whom he has been trying to collect a debt for a long time. You can get your money out of him in this way, and, if I am not mistaken, you will get more benefit when paid thus than if you had received the cash. Be sure you have plenty of drawers in which to keep all such goods as Auger Bits, Chisels, Screw Drivers, &c., for it is a most expensive and extremely slovenly way to keep them in the original package on the shelves, or, worse yet, if these happen to be destroyed or lost, to carelessly wrap them up in paper and lay them on the shelves; there is entirely too much of such work as this in the average Hardware store and it eats into the profits.

Do not neglect your sampling. The best plan is to have the ends of the drawers covered with green flannel—paint will do, but it is not so satisfactory—against which most articles will show to advantage. Fasten the articles through the end of the drawer by means of copper wire. It is necessary to have a bottle of lacquer for the polished goods. This when applied properly will retain all the luster of the goods, and prevent them from rusting for an indefinite time. Bear in mind that soiled and rusty samples are worse than none. Now look at your ceiling and the wood work of your store. Quite likely they need a coat of paint, or at any rate a washing will improve them very much. You will be surprised at the difference in the appearance of your store, owing to a little attention given to these smaller matters.

Forget or ignore all the rest if you will, but dust and sweep thoroughly every day; it will pay you. All this may seem too expensive, and you may think it will involve too much labor. That is a mistake. All the improvements that I have mentioned will cost but a comparatively small sum, as you can do the most of them yourself, with the aid of your clerks, in your dull hours, such as always follows the holidays. Your old customers will appreciate your efforts, new ones will be attracted thereby, and you will get your money's worth of satisfaction out of the improved surroundings. Show your customers that you handle good goods by the care you take of them and the interest you show in the appearance of your store room.

Wire vs. Cut Nails.—In reply to the communication which appeared in our issue of December 24, we have the following from a prominent Hardware merchant of Michigan, in which it will be observed that he refers to the advantages of Wire Nails, and controverts some of the conclusions of our correspondent:

While reading *The Iron Age* of December 24 regarding the relative merit of Cut and Wire Nails, we were reminded of our experience in regard to them. We were slow to take hold of Wire Nails because we disliked to carry two complete lines, but were forced to do so. Now much less than 5 per cent. of our sales are Cut Nails. As to the relative value of Nails, we have to depend almost entirely on our customers for information. Economy has much to do with it. With us Cut Nails retail for 3 cents and Wire for 4 cents. A farmer wants 5 pounds 10-penny Nails. If he buys Cut he gets 300 Nails for 15 cents, or 20 Nails for 1 cent. If he buys Wire Nails he gets 450 Nails for 20 cents, or over 22 Nails for 1 cent. If he buys 8 penny he gets 28 Cut Nails and 33 Wire Nails for 1 cent. It does not take a farmer long to figure this out. In keg lots the difference is still greater in favor of Wire Nails. When it comes to Brads the Cut Brad is "not in it" at all. We have a fair stock of Cut Brads that we will be very glad to

close out at 50 cents on the dollar. We think a Wire Nail can be started a trifle easier than a Cut Nail, but we think the makers of Wire Nails can remedy this defect, if it is a defect, by corrugating or barbing their Nail without additional expense. The head and point of the Wire Nail are far superior to those of the Cut Nail. Our customers all like Wire Nails the best and will buy no other.

We have also the following communication from a well-known house in Western New York, in which they give their experience with Wire Nails:

We have read your article on "The Future of Wire Nails" and also the letter from your correspondent, and we find that the same differences of opinion exist now in regard to the efficiency of the two styles of Nails that existed a few years ago or when Wire Nails were first put on the market, although "not so much." Our first purchase of Wire Nails was four kegs. We placed them on the floor and called the attention of our customers to them, and since that time our trade has constantly increased till now we sell ten kegs of Wire Nails to one of Cut. We sell most of our Wire Nails for building purposes and we have yet to hear of a clapboard that has warped or a shingle that has blown off. We think the Wire Nail has come to stay.

Balancing Books.—We have an inquiry from one of our subscribers in regard to the methods adopted by the trade in closing their books for the year when the accounts are kept by single entry, and especially as to the manner in which they arrive at the profits of the year's business. We shall be glad to have any information on these points that our subscribers may be kind enough to give.

Inventory Taking Again.—A correspondent signing himself "Secretary" comments upon the results of the year's business, as shown in the article entitled "Inventory Taking" in our issue of December 17, as follows:

I think that the bookkeeping of the Connecticut house who writes in your issue of December 17, under heading of "Inventory Taking" needs some remodeling. In the first place "profit and loss" is a misnomer, and should be "loss and gain." In next place they say "bad accounts entered separately," which means that throughout the year they enter bad accounts to this account ("loss and gain") as they occur. The loss and gain account is a summary of the year's prosperity, or adversity, as the case may be, and is merely the exposition of final balances from accounts to be closed into loss and gain and is in no sense intended as a sewer into which to throw accounts promiscuously. The bad accounts should be closed into a "bad account" account or "lost accounts and notes" account, which I think is better, and at end of year the balance carried into loss and gain. They also in their summary show a profit of \$8720, which is incorrect and misleading to the writer in December 3d issue, whom they answer. As I said before, the loss and gain account represents the prosperity or adversity of the year and no balances of any kind should be carried into next year in this account, but should be closed into some other account. For instance, the \$5670 in 1891 business should have been either carried into stock account, to each partner's account in proportion to investment, or to a surplus account. Then the 1891 business would show a profit of \$5670, and, of course, the \$5670 added to stock account would be exactly the difference between the assets and liabilities of

the concern and would show their net worth. Your correspondent of December 3 would infer from loss and gain account that profit of the year's business was \$8720, when, in reality, it was \$3050, as the \$5670 belonged to last year's profits and this year figures only in ascertaining the net worth of the concern.

It Is Reported—

That the stock of Hardware of H. T. McCallen, Richland, Texas, was destroyed by fire on the 27th ult. Loss, \$4000; insurance, \$2500.

That the stock of Hardware, Groceries, &c., carried by J. M. Osborne, Eddy, Texas, was consumed by fire on the 28th ult. The loss is estimated at \$15,000 to \$18,000, and the insurance at \$8000 to \$9000.

That T. James Fernley, wholesaler of Hardware, 501 Commerce street, Philadelphia, will, as soon as alterations and repairs are completed, remove to the five-story warehouse, 505 Commerce street.

That the Hardware store of Clark, Ellis & Sons, Milford, Mass., was burglarized on the 1st inst. \$200 worth of goods were stolen.

That Charles L. Chalmers, formerly of the firm of Haynes, Pillsbury & Co., Bangor, Maine, has purchased an interest in the business, and it will be conducted in the future at the old stand, under the firm style of Haynes & Chalmers.

That L. F. Zuck, who has been connected with the Hardware business for the past few years with several firms in Erie, Pa., has opened a first class Hardware store at 1518 Peach street, in that city.

That the Hardware store of C. E. Grass, Frankfort, Ind., was totally destroyed by fire recently.

That N. A. Mead of Franklin, N. Y., intends to open a Hardware store at Atlanta, Ga.

That L. H. Cary has opened a new Hardware store at Seneca Falls, N. Y.

That J. B. McLean is about to open a Hardware store in his new building at Hermon, N. Y.

That the Hardware store of J. T. Spear & Co., Sinclairville, N. Y., was robbed on the 25th ult. About \$300 worth of goods were secured.

That Hancock & Humphrey are a new Hardware firm at Union Grove, Wis.

That Barlow & Co's Hardware store at Croton Landing, N. Y., was burned out on the 24th ult.

That Gingerich & Watson will fit up a new Hardware store at Reading, Kan.

That E. W. Lamb, Clyde, Kan., is preparing to move to larger quarters.

That the Hardware store of C. W. Werner, St. Joseph, Mo., was slightly damaged by fire on the 25th ult. Loss, about \$500.

That Mr. Funk of the Hardware firm of McKown & Funk, Ludlow, Ill., has sold his interest in the firm to Homer Werts. The firm will hereafter be known under the style of McKown & Werts.

That G. G. Gidding's Hardware store at Alvarado, Texas, was robbed of \$40 worth of goods on the 24th ult.

That W. T. Johnson, late of Leavenworth, Kan., has been admitted as a partner into the Hardware firm of W. L. McMillan & Co., Kingston, N. Y., having purchased an interest in the business. The new firm will be known as McMillan, Johnson & Co.

That Bjorneby & Newgard will open a new Hardware store at Grafton, N. D., early in January.

That the Kenyon-Connell Commercial Company is the name of the new Hard-

ware concern at Butte, Mont., growing out of the consolidation of the Kenyon and Jack Hardware houses. The capital stock is \$250,000, divided into 2500 shares of \$100 each.

That Burtis & Lambert will commence the Hardware business at Lockport, N. Y., shortly.

That M. Diggs will open a new Hardware store at Woodland, Cal., January 15.

That the Polson-Wilton Hardware Company have been incorporated at Olympia, Wash., with a capital of \$50,000.

That A. K. Hanson's Hardware store at Rushford, Wis., was entered by burglars a short time since, who got away with a small quantity of goods.

That J. K. Zerbe has bought the interest of Mr. Feighner in the Hardware and Provision business of Feighner & Robinson, Sulphur Springs, Ohio.

That B. F. Paul, Goshen, Ind., has sold his Hardware store.

That the Hardware store of William Langworthy, one of the oldest business houses at Seneca Falls, N. Y., has been sold to Messrs. L. Story and L. C. Strong, who will hereafter conduct it under the firm name of Story & Strong.

That Gardiner & Bell are a new Agricultural Implement firm at Bluffton, Ind.

That at a recent fire in Red Key, Ind., the stores of H. Cadwallader, C. Hardy & Son and Reeves & Son, dealers in Hardware, and P. Orr, dealer in Agricultural Implements, were seriously damaged.

That McCampbell & Gortner have commenced the Hardware and Implement business at Fontanel, Iowa.

That Lost Nation, Iowa, has a new Hardware and Stove store, the proprietor of which is Henry Dobbiling.

That Wylander Bros. at Ogden, Iowa, have commenced the Implement business.

That B. F. Drake, Friendship, N. Y., has taken L. S. Howard into partnership in the Hardware business. The firm name will be Drake Hardware Company.

That Taylor Bros. have opened a general store at Pomeroy, Iowa. They will also carry a considerable line of Hardware.

That D. Judy, Cheboygan, Mich., was damaged by fire a short time since.

That McLaughlin Brothers, Litchfield, Minn., have been burned out.

That the retailing of Agricultural Implements has recently been commenced by Peter A. Johnson at Stewartsville, Minn.

That Bennett Bros., Implement dealers, Deer Lodge, Mont., have been dissolved.

That A. P. Sargent is the proprietor of a new Hardware store at Valparaiso, Neb.

That John S. Swift, Silver City, N. M., has sold out his Hardware business.

That the E. L. Wilson Hardware Company have been organized at Beaumont, Texas, with an authorized capital of \$100,000.

That B. O. Andrew, dealer in Hardware and Agricultural Implements, Brooklyn, Wis., has been succeeded by F. W. Wolfe.

That E. Jones & Son, Cambria, Wis., are out of the Agricultural Implement business. L. Crandall continues at the old stand.

That Thompson, Michelson & Co., New London, Minn., dealers in Implements, will retire from business about the first of the year.

That A. McLean has sold his Hardware business at Brandon, Man., to P. C. Mitchell and James M. Brown. Messrs. Brown and Mitchell were formerly in the employ of S. F. Johnston & Co., Hard-

ware merchants, and are well known in Brandon.

That A. Sydenham's Gun store at Montrose, Col., was destroyed by fire on the 14th inst.

That Hocking & Tucker are about to open a Hardware store at Stockton, Ill.

That F. C. Hackett is building a Hardware store at Queen Anne, Md.

That James Kaver, a former Hardware merchant at Tarport, Pa., has commenced the Hardware business at McGregor, Texas.

That L. W. Lazell, Stockton, N. Y., has sold his stock of Hardware to L. F. Shepard.

That Geo. W. Peck & Co., Bath, N. Y., have recently erected a storehouse in the rear of their Hardware establishment. The dimensions of the structure are 50 x 60 feet, two stories high.

That Neville & Whitney, Grand Forks, N. D., have sold their Hardware business to James Heard.

That Ward & Walcott, W. Farmington, Ohio, are erecting an addition to their Hardware store.

Barb Wire in 1891.

THE PAST YEAR was quite an important one in the history of the Barb-Wire trade. Negotiations which had begun in 1890 for the purchase of the patents from the Washburn & Moen Mfg. Company by the manufacturers themselves were concluded in February, when the organization of the Columbia Patent Company was announced. All the patents were, by purchase, vested in the control of this company, composed of all the then active manufacturers of the country. The general offices of this company were established in Chicago, which thus became Barb Wire headquarters. At first the Columbia Patent Company did not assume to regulate prices, but an arrangement was consummated in July by which the company became sales agent for about 90 per cent. of the Barb-Wire output of the country, and from that time established prices on a pretty firm basis. The only period in the entire year during which the Barb-Wire market was left to its own influences was during the first six months, although an attempt was made by manufacturers at the beginning of March to name a uniform price, which was pretty generally adhered to through that month and April, after which prices gave way steadily until July, when the Columbia Patent Company became an active factor commercially. The following table shows the course of prices at Chicago for Painted Wire in carload lots for both 1890 and 1891, the monthly prices being averaged from weekly quotations:

Months.	1891. Cents.	1890. Cents.
January.....	2.70	3.25
February.....	2.70	3.35
March.....	2.85	3.30
April.....	2.85	3.15
May.....	2.82½	2.90
June.....	2.75	2.85
July.....	2.70	2.85
August.....	2.77½	2.85
September.....	2.80	2.85
October.....	2.55	2.85
November.....	2.55	2.75
December.....	2.55	2.70
Average for year.....	2.72	2.97

Death of David Robertson.

THE trade will learn with very sincere regret that on Monday, December 28, at the residence of his brother, W. E. Robertson, in Santa Barbara, Cal., occurred the death of David Robertson, the junior member of the firm of Foster & Robertson, Portland, Ore. The latter part of September Mr. Robertson returned to his home in Portland after a seven months' trip abroad, in which he was accompanied by his wife. Almost immediately after his return he was taken down with typhoid fever, from which he recovered sufficiently by December 15 to venture on a trip to California for recuperation. On his way down he was taken with a relapse, pneumonia set in, and in spite of every effort he passed away within a few days after reaching his destination.

In the death of David Robertson the business community of Portland suffers a loss not easily made good. He enjoyed the confidence and esteem of the entire community to the highest degree and was regarded as a young man of more than usual business ability.

An Elegant Catalogue.

FAYETTE R. PLUMB, Philadelphia, favors the trade with an illustrated catalogue and price-list which in size and elegance even surpasses those formerly issued by him. The illustrations include Hammers, Edge Tools, Sledges, Blacksmiths', Miners' and Railroad Track Tools, Picks, Mattocks, Grub Hoes, &c. The catalogue contains nearly 460 pages of calendered paper, with the description and prices on the left-hand page, and the illustration of the article described on the opposite page. The description of each kind of goods is very full, giving the numbers, size, weight, style, finish, material and the manner in which they are packed. These particulars are given in a well-arranged and comprehensive form. Goods which are not full polished are printed in colors showing the parts which are finished in bronze or are painted red or blue. Each page is surrounded by an artistic border, and the volume is handsomely bound in Russia leather and cloth. The growth of the business is graphically shown by a series of seven illustrations in the front of the book, giving views of the plants at different dates since 1856, at which time the business was conducted by Jonathan Yerkes, closing with the extensive works of Fayette R. Plumb at the present time. The trade cannot fail to appreciate this superb presentation of a line of goods already so favorably known. In the manufacture of these goods, a system of inspection has been recently inaugurated which is so thorough that it is said to be almost impossible for a defective tool, either in quality or finish, to pass without detection. New goods have been added since the issue of the last catalogue, and particular attention is called to the Vulcan Tool Company's brand of Hatchets and Sledges, which are offered in competition with other standard lines.

Hardware in South Africa.

LETTER FROM OUR FOREIGN REPRESENTATIVE.

DURBAN, NATAL, December 18, 1891.

Your correspondent has been something over three months in South Africa, visiting the three ports of Cape Colony and the only port of Natal.

The point I made in an earlier letter, of the great advantage accruing to a manufacturer who would furnish sterling prices to the trade out here, has been much emphasized in my later experience.

Sterling prices, of course, are better now in all foreign markets, except the far East, than American figures.

I even found buyers on the European Continent who would change my prices into sterling first and then into their own money.

Another point of very great advantage for the manufacturers, so far as they are acquainted with the trade here, is to send their catalogues and discounts direct to the trade, not with thought of direct business, for that involves a great deal of risk and detail, but to have the buyers in foreign markets more closely associated and interested with our products. Colonial buyers do not favor direct purchase of the manufacturer.

It is true that I found in some offices a large assortment of American catalogues, but many of these are very ancient and a large number have not a discount sheet or net prices.

Importers in this country attach a great deal of importance to their freight cost; I know of an American Hardware manufacturer who has gained quite a foothold against an English maker because he gets more dozens of the same goods in a case measuring so many cubic feet, and I am greatly aided in marketing one of my lines because the manufacturer interested with me has made a science of compact packing to reduce measurement in export shipments. The game is well worth the powder.

The conditions of trade at Durban are very similar to those of Port Elizabeth; each city having a population of 20,000. There are here four Hardware houses, each of whom probably do a larger business than those of the lower port, but the main business of the interior is done by the large general merchants who have Hardware departments in addition to everything else.

Price rather than quality is more the demand here than at other points which I have visited; this is due to the "Kaffir trade," as native business is called.

This port is straining every nerve to hold its own against Port Elizabeth for the trade of the interior.

In Australia the population is almost entirely on the seaboard; in this country the reverse is true, and Johannesburg—400 miles from the coast and over 100 miles from a railroad—is, excepting Cape Town, the largest city in South Africa, so

so that the purchasing power of the interior is really greater than the local trade of the coast provinces.

You get some conception of the possibilities of the Transvaal Republic in the statement that Johannesburg will produce this year a clear 700,000 ounces of gold, and this in less than five years of mining.

Of course all Hardware lines appertaining to such industries have a very large sale.

I am surprised to learn the immense trade at this port in American Plows; one merchant here told me that he had imported this year 2000 of these from the States.

Though my statement may contradict in some measure that of my previous letter, statistics just issued prove that this port has received more American products than any other port in South Africa during the ten months last past. This includes 13,000 reels of Barbed Wire out of a total of 20,000, 500 corn shellers and other sundries. Seven vessels arrived here from New York in three months prior to October 1, bringing a total cargo valued at \$255,000.

The customs duties here are but 5 per cent., while those of the Cape Colony are 12½ per cent., with slight variations in each case.

This low duty is a special bid for up-country business.

The Natal railways have immense shops at this place and order considerable supplies from America, so the general manager told me, through one of our New York commission houses.

The railway is now some 400 miles long, and if the Dutch Republic will permit this railroad to cross its borders this Government will at once push on to Johannesburg, but the antagonistic feeling prevailing between the Dutch and the English will, I fear, prevent the consummation of this for some time, so that merchandise after reaching the border is loaded on bullock carts to a weight of 8000 pounds each, and so transported, there being 16 to 18 oxen in each team, a slow and expensive way, and an impassable barrier sometimes when the roads are bad or the grass dried up.

Freight from the coast to Johannesburg costs about \$75 per ton weight, and takes about three weeks, or as long as from London here.

The greatly increased output of gold, the growing favor in which Natal coal is received, the successful deepening of the harbor, all give a buoyant feeling to the merchants as they canvass prospects for 1892.

POLHEMUS LYON.

THE PAGE ADVERTISEMENT of Russell & Erwin Mfg. Company, New Britain, Conn., and New York, is of special interest, as calling attention prominently to their line of Wrought-Steel Door Locks, with representations of two leading Locks which at the same time illustrate some of the special features of their line. The manufacture of these goods will generally be recognized as one of the most important new departures in the manufacture of Hardware. Some of the advantages possessed by the goods are referred to in the advertisement.

The Chicago Nail Trade in 1891.

BY WAY of preparation for a review of the Nail trade of Chicago in 1891, the following table is presented, showing average monthly quotations from our trade reports of Cut Steel and Wire Nails, in factory lots, laid down in Chicago, as compared with prices for 1890.

Months.	1891.		1890.	
	Cut Steel.	Wire.	Cut Steel.	Wire
January.....	\$1.75	\$2.22½	\$2.50	\$2.90
February.....	1.75	2.27½	2.40	2.95
March.....	1.80	2.22½	2.30	2.75
April.....	1.75	2.12½	2.10	2.40
May.....	1.70	2.05	1.85	2.30
June.....	1.70	2.02½	1.95	2.40
July.....	1.65	2.07½	2.00	2.40
August.....	1.70	2.02½	2.00	2.50
September.....	1.70	2.00	1.95	2.55
October.....	1.65	1.90	1.95	2.40
November.....	1.65	1.85	1.85	2.30
December.....	1.65	1.80	1.75	2.25
Average for year	\$1.70½	\$2.05	\$2.05	\$2.51

It will be seen from this table that there was an almost continuous decline in prices from the month of January, 1890, to December, 1891. The year 1891 opened with a very heavy demand for Wire Nails, almost every country merchant laying in a carload or more, because they had never before been so cheap. In the light of subsequent reductions this seems somewhat amusing, but it must be remembered that all values are comparative and even a high price at one time may seem cheap at another. Cut Nails were not nearly so active as Wire at this time, constituting but one-fourth of the volume of business done in Nails in the Chicago market. In the latter part of January Billets and Rods advanced in price and Wire Nails followed, trade becoming more active as the goods became dearer. Cut Nails caught the infection to some extent. February was a very active month; in fact, these two months were the heaviest opening months of the year ever known in Chicago. March was dull, but prices were fairly maintained, Cut Nails working up a slight advance on their own account. April brought with it a weakness in Wire Nails and prices receded, with complaints rife for the first time of Wire of bad quality being used, together with a heavier gauge, yielding fewer Nails to the pound. Cut Nails improved in demand to some extent, and manufacturers were cheered at the receipt of orders from districts in which the Wire Nail had for a time exercised absolute sway. In May lower quotations were made on both kinds of Nails. The Wire Nail manufacturers tried to resist the downward tendency and held a meeting at Cleveland to devise some remedy, but were not successful. The prospect of labor troubles at Wire Nail factories in June and July was dwelt upon as likely to advance prices, but it did not do so. Before the month ended Nails were lower than ever. June was a good

month for the Cut Nail trade, orders being numerous and large. A single order amounted to 20,000 kegs. Wire Nails, however, were weak and lower in price, one manufacturer after another unloading surplus stock on the market. As July approached the Cut-Nail makers became demoralized in turn and their prices dropped. The demand improved this month, the price of Wire Nails being stiffened by advancing prices for Rods, owing to the closing of several mills for extensive repairs. The demand was not sustained throughout the month, but revived after August set in, when a very heavy trade was done in Wire Nails, but at drooping prices, evidently caused by manufacturers hastening to dispose of their output while buyers were in the mood to take it. Heavy contracts were placed about this time for Cut Nails for the World's Fair buildings. Cut being exclusively used. These contracts were taken at low rates, understood to have been the lowest prices known in the history of the Chicago Nail trade. Prices then stiffened a trifle in both August and September, the latter month witnessing an active demand for all kinds of Nails. The Wheeling Nail factories were by this time practically shut out of the Chicago Nail trade, the business being controlled by Indiana factories. October saw Wire Nails selling at lower prices than before, but a very heavy trade in progress. Cut Nails were also active and lower. The last quarter of the year was characterized by frequent raids on the market by Wire-Nail factories, resulting in a complete demoralization of prices, until \$1.60 at factory seemed to strike a point below which no one cared to descend. Attempts were frequently made to get the manufacturers together to correct this condition of affairs, but no plan suggested seemed to be acceptable, and the market was left to itself. In the last great unloading of stocks in December one manufacturer is reported to have disposed of at least 100,000 kegs. During this time the local Cut Nail factories were kept well employed, but the business was not of large enough proportions to invite serious inroads from the more distant concerns. The year ended with prices of Nails at their lowest, yet with a confident feeling among manufacturers that they were on the eve of an improvement which would bring about an era of better prices.

Roads.

D. R. SPERRY of Batavia, Ill., the well-known manufacturer of Hardware specialties, is an enthusiastic advocate of good country roads, and is doing all he can with word and pen to stimulate public interest in this very important question. We have recently received copies of articles written by him for Illinois newspapers, in which strong arguments are advanced in favor of improving country roads, and other practical suggestions are made as to how the work should be done. Mr. Sperry is an advocate of broad-tired wagons, claiming that narrow tires under heavy loads are largely responsible for rough roads at

times when broad tires would keep the roads in fair condition. He also favors the employment of convicts in making and repairing roads, which would enable this important work to be done at comparatively light expense, while the convicts would have employment without being brought into competition with free labor in any branch of manufacturing. Considering the mud embargoes in many parts of the country, which almost suspend business for a considerable part of every spring, this is a subject in which all rural merchants are deeply interested, and Mr. Sperry should have powerful support among them in his crusade against mud.

Exports.

PER BARK SATURNUS, DECEMBER 30, 1891.

FOR NELSON.

By McLean Bros. & Rigg.—6 cases Choppers, 1 case Snaps, 1 case Air Guns, 5 cases Wringers, 1 case Miter Boxes, 1 case Lead Pencils, 1 package Ladders, 6 cases Horse Nails, 4 cases Saws and Files, 4 cases Wringers, 7 cases Planes, 1 case Hardware, 1 barrel Lampware, 12 cases Axes, 2 cases Bird Cages, 1 case Hammers, 3 cases Plows, 2 packages Lanterns, 1 case Hammers, 2 cases Braces, 1 case Tacks, 6 cases Hardware, 1 case Hay Knives, 6 packages Lampware, 7 cases Cartridges, 4 packages Hardware, 5 crates Churns, 4 cases Wringers, 3 cases Horse Nails, 1 case Bench Screws, 17 cases Axes.

By R. W. Forbes & Son.—5 cases Granite Ware, 10 cases Axes, 2 cases Lampware, 15 packages Hardware.

FOR WELLINGTON, NEW ZEALAND.

By W. R. Forbes & Son.—25 cases Axes, 3 cases Oil Stone, 3 packages Lampware, 20 cases Axes, 1 case Plated Ware, 2 packages Pumps, 4 packages Hardware, 4 cases Nails, 90 cases Axes, 8 cases Wringers, 9 cases Hardware, 13 cases Horse Nails, 19 packages Hardware, 25 dozen Hammers and Hatchets, 4 boxes Scales, 2 packages Pumps, 21 cases Horse Nails, 8 cases Hammers and Axes, 26 packages Carriage Hardware, 30 packages Hardware, 6 packages Lampware, 14 packages Scales.

By McLean Bros. & Rigg.—11 cases Axes, 7 cases Hoes and Drills, 2 cases Manure Forks, 1 case Vises, 8 cases Cartridges, 1 case Pulleys, 14 cases Scales, 2 cases Lampware, 1 case Seed Sowers, 20 cases Axes, 5 cases Wringers, 3 cases Lampware, 3 cases Rat Traps, 13 cases Agate Ware, 5 cases Bird Cages, 1 case Carpet Sweepers, 2 cases Axes, 10 cases Carriage Hardware, 5 dozen Agate Ware and Sinks.

By W. H. Crossman & Bro.—7 Hay Rakes, 20 dozen Axes, 15 Bolt Cutters, 5 dozen Wringer Rollers, 2 dozen Wrenches, 56 Churns, 2 dozen Lawn Mowers, 23 Emery Wheels, 2 boxes Die Stocks, 2 cases Agricultural Implements, 3 packages and 14 cases Hardware, 70 cases Axes.

By Arkell & Douglas.—5 cases Springs, 4 cases Bolts, 10 cases Hardware, 200 cases Axes, 5 cases Wringers, 6 packages Nails, 11 cases Horse Nails, 17 cases Axes.

By F. H. Lovell & Co.—1300 pounds Lamp Goods.

CONCLUDING SHIPMENTS PER BARK GALATEA, DECEMBER 22, 1891, FOR SYDNEY, N. S. W.

By R. W. Forbes & Son.—25 packages Hardware, 8 packages Lampware, 11 packages Tinware.

By F. B. Wheeler & Co.—2 cases and 1 crate Hardware, 2 cases and 1 package Hardware, 1 case Tinware, 1 case Hardware, 49 cases Axes, 2 cases Lead Pencils, 3 cases Crayons.

By Coombs, Crosby & Eddy.—2 cases Axe Handles, 2 cases Shovel Handles, 1 case Pumps, 1 case Hardware, 3 cases Steel Axes, 3 cases and 3 barrels Lamp Goods, 8 cases Axe Handles, 9 crates Churns, 6 cases Steel Saws, 1 case Hardware, 1 case Iron Wrenches, 1 case Locks, 7 cases Hardware, 2 cases Braces, 2 cases Hammers, 1 case Wrenches, 1 case Tools, 16 cases Hardware, 4 cases Bird Cages, 3 cases Boring Machines,

2 cases Hardware, 6 cases Mills, 2 cases Hardware, 4 cases Wireware.

By W. H. Crossman & Bro.—1 box Hinges, 1 case Shears, 1 case Snaths, 27 boxes Axes, 10 cases Hardware, 2 cases Hammers, 1 case Transom Lifters, 2 crates Churns, 10 boxes Axes, 1 case Rakes, 1 case Potato Hooks, 3 cases Tills, 2 packages Lamp Goods, 7 cases Primers and Cartridges, 1 case Rifles, 1 case Loading Tools, 1 case Plated Ware, 20 boxes Axes, 24 cases Hardware, 2 packages Hoes, 3 cases Fire Hose, 6 cases Corn Mills, 3 packages Plated Ware, 1 case Traps, 3 cases Carpet Sweepers, 6 cases Hardware, 80 cases Axes, 3 cases Hardware, 13 cases Wringers, 1 case Traps, 66 boxes Axes, 3 dozen Registers, 3 dozen Wrenches, 2 cases Hardware, 3 packages Lamp Goods, 4 packages and 2 cases Hardware, 28 boxes Axes, 3 cases Iron Nails, 10 boxes Axes.

By Strong & Trowbridge.—1 case Hammers.

PER SCHOONER H. E. THOMPSON, DECEMBER 22, 1891, FOR CAPE TOWN, SOUTH AFRICA.

By J. Norton's Son.—219 coils Manila Cordage.

By M. Berliner.—3 packages Pumps.

By H. W. Peabody & Co.—1 case Iron Forges, 2 cases Hardware, 6 cases Lanterns, 6 cases Hardware, 4 packages Lawn Mowers, 41 packages Wheelbarrows.

By W. B. Fox & Bro.—1 case Freezers, 7 cases and 1 barrel Hardware, 24 cases Agricultural Implements, 6 packages Lanterns, 12 cases Edge Tools.

By Arkell & Douglas.—1 dozen Ladders, 14 dozen Hatchets, 3 dozen Sprinklers, 4 dozen Choppers, 12 dozen Fly Traps, 1/2 dozen Washers, 3 cases Carpenters' Tools.

By Strong & Trowbridge.—6 dozen Axes, 1 gross Can Openers, 60 dozen Locks, 6 dozen Wrenches, 6 Scales.

By Coombs, Crosby & Eddy.—2 crates Rat Traps, 8 cases Edge Tools, 9 Platform Scales, 12 Churns.

By Sherman & Lyon.—3 cases Lead Pencils, 6 boxes Sad Irons, 1 case Thermometers, 1 case Wire, 6 boxes Lanterns, 1 case Hammers, 7 boxes and 1 barrel Lamp Goods, 2 cases Step Ladders, 13 cases Meat Cutters, 3 cases Wrenches, 7 cases Hardware, 1 case Rat Traps.

By W. H. Crossman & Bro.—2 dozen Agricultural Implements, 23 cases Hardware, 100 reels Barb Wire.

PER SHIP REMBRANDT, DECEMBER 25, 1891, FOR MELBOURNE, AUSTRALIA.

By Russell & Erwin Mfg. Company.—2 cases Hardware.

By McLean Bros. & Rigg.—18 cases Plows, 12 Shellers, 86 Plows.

By Bradley & Hubbard Mfg. Company.—27 packages Lamp Goods.

By Edward Miller & Co.—11 packages and 1 box Lamp Goods.

By Henry Disston & Sons.—16 cases Hardware.

By Peck, Stow & Wilcox Company.—16 boxes Hardware.

By Henry Disston & Sons.—7 cases Hardware.

By Bradley & Hubbard Mfg. Company.—9 packages Lamp Goods.

By McLean Bros. & Rigg.—15 Scales, 35 dozen Granite Ware, 1 case Gate Hinges, 4 packages Lampware, 7 cases Pumps, 1 case Tricycles, 12 cases Stocks and Dies, 2 cases Mouse Traps, 2 cases Locks, 25 kegs Nails, 8 cases Granite Ware, 2 cases Lampware, 3 cases Drills, 1 case Staples, 2 cases Door Checks, 1 case Lawn Mowers, 3 cases Saws, 5 packages Hinges, 14 packages Coffee Mills, 14 cases Wringers, 1 case Lampware, 5 cases Axes, 1 case Lampware.

By Australasian-American Shipping Company.—2 cases Nuts and Bolts, 151 cases Axes.

By R. W. Forbes & Son.—4 cases Carriage Hardware, 1 case Hammers, 2 cases Hardware, 1 case Lampware.

By Sargent & Co.—9 cases Hardware, 2 barrels Bells, 5 cases Hardware, 6 packages Castings, 2 packages Mills, 2 cases Mills, 3 crates Mills, 1 case Castings.

By Alfred Field & Co.—3 cases and 12 packages Hardware, 1 case Springs 1 package Bolt Clippers, 1 case Tacks, 3 cases Bolts, 1 case Tacks, 1 case Hardware.

By W. H. Crossman & Bro.—1 case Hammers, 6 cases Sifters, 1 case Lawn Sprinklers, 10 cases Axes, 10 cases Lamp Goods, 1 case Store Trucks, 11 packages Hardware, 1 case Cartridges, 1 case Rakes, 1 case Air Rifles, 12 cases Lanterns, 1 case Twine Boxes, 2 cases Pumps, 1 box Curry Combs, 5 cases Hardware, 1 case Fire Arms.

By Arkell & Douglas.—138 cases Saws, 524 reels Barb Wire, 4 cases Razor Strops, 3 packages Pumps, 3 cases Agricultural Implements, 2 cases Pencils, 18 cases Manglers, 131 kegs Nails, 11 cases Nails, 210 cases Axes, 10 cases Tinware, 8 cases Agate Ware, 41 cases Tools, 1 case Sandpaper, 6 cases Rivets, 33 cases Bolts, 75 cases Hardware, 2 cases Guns, &c., 200 reels Barb Wire.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

About the only change in the Paint trade has been what may be termed a rechristening of the various corroding establishments connected with the National Lead Company (formerly the National Lead Trust), in accordance with the recent reorganization. Thus the Southern White Lead Company will hereafter be known as the Southern White Lead Works branch of National Lead Company. The Atlantic White Lead and Linseed Oil Company will be known as the Atlantic White Lead and Linseed Oil branch of National Lead Company, and so on all along the line. In short, the different concerns lose their old individual titles and are formally known as branches of the aggregation of corroders. The general management remains the same as it was under late "trust" auspices and it is doubtful that any change will be made unless something unforeseen occurs in the near future to disturb the existing condition of affairs. As regards general conditions nothing is visible in any branch of the trade that contrasts with what is customary at this season of the year. Business is slow nearly all along and more activity is noticeable in preparations for the season that will soon be at hand than in seeking orders.

White Lead.—Up to the present time no change in corroders' prices has been announced, nor is information imparted at headquarters of any impending revision of the list or terms. Jobbers are placing few orders and manifest no disposition to swerve from the course that was followed during the greater portion of last year. The cheaper forms of Lead, as well as the unmixed carbonate, are momentarily in light demand, and whether competition will bring about changes when the spring season campaign opens remains to be seen. The distribution by jobbers is on a small scale, and prices in that quarter are still governed more by special conditions than by existing manufacturers' lists.

Red Lead and Litharge.—Glass manufacturers are not placing orders to the extent that they usually do at about this season of the year, and a change on their part prior to meetings at which Glass trade affairs are to be considered is unlikely. From other sources the demand is likewise slow. No change has been made in prices for any of the various grades.

Zincs.—Sales agents, in some instances, note an increase in orders for American Oxide, and operations are, doubtless, on a rather more liberal scale than they have been at any previous time since the middle of last month. All orders that come along seem to be taken with little ceremony at the former line of prices, but no concessions are made. Foreign brands are steady at old prices also, but as yet there is little, if any, increase in the movement out of importers' hands.

Colors.—In this line there has been no change of importance. Grinders are placing some orders for bulk goods used in the manufacture of their various specialties, but otherwise there is little doing in Dry Colors, and the trade in Oil Colors, apart from some few specialties, is still on a moderate scale. Prices are practically stationary nearly all through the list.

Miscellaneous.—The arrivals of Block Chalk seem to be just about sufficient for present wants and are cleared off at about former prices. Whiting prices are unchanged, but sellers are inclined to be firmer since production has been curtailed

by the loss of one factory by fire, while inquiries point to a good spring season movement. The situation in Putty remains the same as it has been for some time and manufacturers' prices vary widely, as does the quality of their goods.

Oils and Turpentine.

The various branches of the market for Animal and Vegetable Oils have seldom been quieter or more featureless for a similar length of time than they have during the week under review. Nothing has occurred that would prompt freer purchases on the part of either the export or the home trade, nor does there appear to be anything in the nature of pressure to sell on the part of manufacturers or importers.

Linseed Oil.—Some sellers of out-of-town brands, it is reported, are selling single barrels at prices that have latterly been quoted for full carloads only and there is slight evidence that those sellers are anxious for an outlet for Oil at present on hand, although disinclined to accept orders for spring delivery at corresponding rates. This would reflect a rather weak position on spot goods for the time being, but city crushers have made no reduction in their prices, and claim that the inducements made by the outside interest have thus far failed to divert a great deal of Eastern custom from the regular channels. In the Western markets prices are relatively as low as they are here, and at present cost of seed afford little, if any, margin of profit. Thus Oil is quoted at as low as 32¢ per gallon in Chicago, while seed is bringing 94¢ @ 94½¢ per bushel for present delivery and \$1.01 upward for spring delivery.

Cotton-Seed Oils.—Since September 1 about 3,500,000 gallons have been exported to Europe, against less than 2,000,000 gallons sent out during the corresponding period last year, and that, too, in the face of a continuous series of doleful accounts from the foreign markets. Southern authorities assert that home consumption, particularly in the West, has been heavy since the opening of the season, and that the stock remaining back in the South is by no means burdensome. Along with all this is volunteered the statement that an enormous cotton crop does not signify a large supply of seed (which is intended to mean that there is none too much raw material) and that the Oil-producing qualities could be better. The fact remains, however, that enough Oil is still found to supply all outlets at about the lowest prices of the season. That of itself would seem to carry more weight than the valuable information sent in from the primary markets. Transactions in this market during the week involve about 1000 barrels crude at 22½¢ @ 23¢ for "off" and 24½¢ @ 25¢ for prime quality, and a similar quantity of refined at 28¢ @ 28½¢ and 28½¢ @ 29¢ respectively.

Lard Oil.—The cost of raw material has been somewhat higher, and on prime quality Oil sellers are very firm, but still take orders at the prices that ruled a week ago. For the low grades there is little call at present, and the market for the same is barely steady.

Fish Oils.—Outside of a seasonably fair jobbing distribution of refined products there has been little or no movement, but the entire market remains in strong position statistically and prices are very firm.

Miscellaneous.—Cocoonut, Palm and Olive Oils are without change in price and move off rather slowly, chiefly in moderate sized parcels. Mineral Oils in general are quiet at the moment. The only exception is Paraffine, and of Red the supply continues rather light.

Spirits Turpentine.—The arrivals here during the week have been moderate, but trade was slower still and prices dropped a fraction; 34¢ was accepted for regular and 35¢ for machine barrels.

Wrought-Iron Blocks.

The Cleveland Block Company, Cleveland, Ohio, have recently adopted improved methods of construction in ice gin and wire rope blocks, as illustrated herewith. These have open wrought-iron frame work and stiff swivel hooks. Blocks are also made in this form for manila rope, and all are self-lubricating. The points of superiority claimed by the manufacturers are that the swivel head of the hook is made by the drop-forge process, of exact size and full strength; while in case of accident to the hook the collar can be readily slipped off after heating, thus



Fig. 1.—Upper Ice Gin.

allowing a simple replacement; also that the guard arms are furnished with friction rollers to prevent any possible chafing of the rope. The improvements are in the line of a decrease of both weight and cost, the latter resulting in the reduction of their list of wrought-iron wire rope blocks from 30 to 50 per cent, the discount remaining

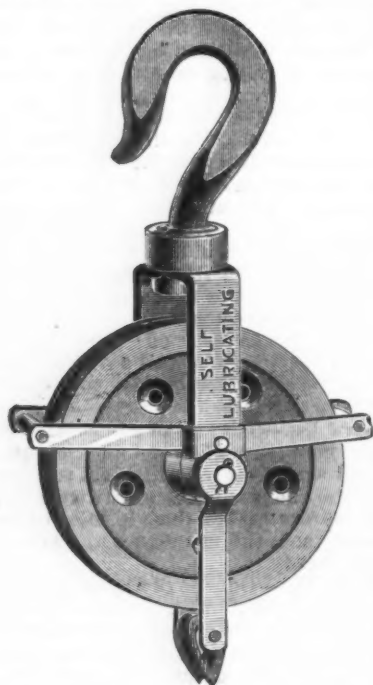


Fig. 2.—Single Block for Wire Rope.

unchanged. All surplus material has been discarded, and the reduction in price has been accomplished, it is stated, without the sacrifice of any efficiency.

A Repair Clerk.—We have heard of a merchant who paid one of his brightest employees a little extra to act as repair

clerk. He watched things about the store with that idea in his head and kept everything mended up as soon as broken. It saved a good many dollars to that long-

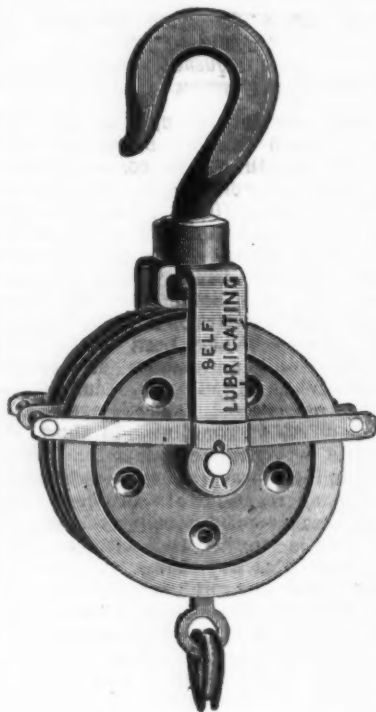


Fig. 3.—Double Block for Wire Rope.

headed retailer in the course of a year—*Mixed Stocks.*

Combination Lawn and Garden Rake.

Oneida Lawn Rake Company, Oneida, N. Y., C. E. Jennings & Co., 97 Chambers street, New York, are offering this article, as illustrated herewith. It has steel wire teeth, hardwood head, malleable iron shank for holding the handle, steel cleaning bar and shoulder. The cleaning bar has perforations through



Combination Lawn and Garden Rake.

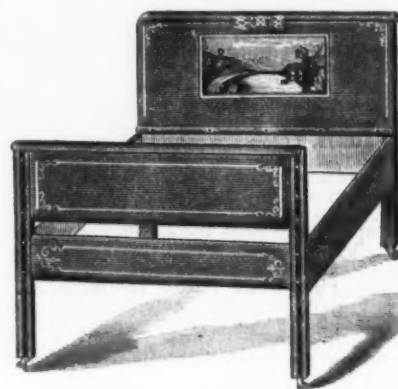
which the teeth pass and is attached to guides on the head. The teeth are curved in such a manner that the cleaning bar slides toward the head when the handle is held in a perpendicular position; the more perpendicular the handle the further up the bar slides. When the rake head is raised from the ground the bar slides down on the teeth of its own weight, thus cleaning the rake of refuse. It is stated that the rake cannot be clogged with either leaves, weeds or grass, and that it is substantially and neatly made.

Rockford Bit Company, Kokomo, Ind., are putting up their cast steel and Jennings' auger bits one-half dozen in each box, and they are packed only in slide-lid dovetailed wooden boxes. They use natural gas in the manufacture of their goods, whereby forges can be kept for a whole day at an exact temperature. This they

refer to as insuring uniformity in forging and tempering. They also have fancy hardwood boxes for sets, with improved extra strong brass fastenings for holding the bits securely in their places. These cases contain 6, 9 and 13 bits each, with nearly 40 different assortments in sets in common and Jennings' auger bits. It is the design of this company not only to furnish their customers with the best goods, but to put them in the best and most attractive looking packages.

Sheet-Metal Bedstead.

H. C. Draper, Oswego, Kan., is introducing a bedstead of sheet metal, as illustrated herewith. It has solid metal head and foot boards, with wide side and end rails. It is referred to as being strong, light, clean and cheap, and as being used with slats or any kind of springs. They are finished in oak, mahogany or imitation of other wood, on which the best of var-



Sheet-Metal Bedstead.

nish and hard oil is used. They are made of steel or brass, suitable for homes, hotels, hospitals, &c.

Hawkeye Nail Claw.

The Hawkeye Mfg. Company of Des Moines, Iowa, are putting on the market a



Hawkeye Nail Claw.

new form of nail claw, which is herewith illustrated. It is manufactured in the same way as their rakes, having teeth of wire nails inserted in a strong hardwood frame. It is not only neat and very dur-

able, but has the distinguishing merit of being very cheap.

Engineering News estimates the railroad construction in the United States during 1890 at 4092 miles. Past reports of our contemporary have been very accurate.

The Electrical Atom.

From a speech at a recent dinner of the Institution of Electrical Engineers, London, Prof. William Crookes, the president, we take the following:

Experimentalists are reducing the wave lengths of the electrical rays. With every diminution in size of the apparatus the wave lengths get shorter, and could we construct Leyden jars of molecular dimensions the rays might fall within the narrow limits of visibility. We do not yet know how the molecule could be got to act as a Leyden jar, yet it is not improbable that the discontinuous phosphorescent light emitted from certain of the rare earths, when excited by a high tension current in a high vacuum, is really an artificial production of these electrical rays, sufficiently short to affect our organs of sight. If such a light could be produced more easily and more regularly it would be far more economical than light from a flame or from the arc, as very little of the energy in play is expended in the form of heat rays. Of such production of light nature supplies us with examples in the glow worm and the fireflies. Their light, though sufficiently energetic to be seen at a considerable distance, is accompanied by no liberation of heat capable of detection by our most delicate instruments.

By means of currents alternating with very high frequency, Prof. Nikola Tesla has succeeded in passing by induction through the glass of a lamp energy sufficient to keep a filament in a state of incandescence without the use of connecting wires. He has even lighted a room by producing in it such a condition that an illuminating appliance may be placed anywhere and lighted without being electrically connected with anything. He has produced the required condition by creating in the room a powerful electro-static field alternating very rapidly. He suspends two sheets of metal, each connected with one of the terminals of the coil. If an exhausted tube is carried anywhere between these sheets, or placed anywhere, it remains always luminous.

The extent to which this method of illumination may be practically available, experiments alone can decide. In any case our insight into the possibilities of static electricity has been extended, and the ordinary electric machine will cease to be regarded as a mere toy. Alternating currents have at the best a rather doubtful reputation, but it follows from Tesla's researches that as the rapidity of the alternation increases they become not more dangerous, but less so. It further appears that a true flame can now be produced without chemical aid—a flame which yields light and heat without the consumption of material and without any chemical process. To this end we require improved methods for producing excessively frequent alternations and enormous potentials. Shall we be able to obtain these by tapping the ether? If so, we may view the prospective exhaustion of our coal fields with indifference. We shall at once solve the smoke question, and thus dissolve all possible coal rings.

Electricity seems destined to annex the whole field not merely of optics, but probably also of thermotics.

Rays of light will not pass through a wall, nor, as we know only too well, through a dense fog. But electrical rays of a foot or two wave length of which we have spoken will easily pierce such mediums, which for them will be transparent.

The slower vibrations to which I have referred reveal the bewildering possibility of telegraphy without wires, posts, cables, or any of our present costly appliances. It is vain to attempt to picture the marvels of the future. Progress, as Dean

Swift observed, may be too fast for endurance. Sufficient for this generation are the wonders thereof.

New York's Maritime Progress.

The commercial statistics of the port for the past year, as given by E. W. Houghton, superintendent of the Maritime Exchange, present some singular features. While the commerce of New York is steadily increasing in volume, the number of "bottoms" which carry it steadily decreases. Although the vessels arriving at New York in 1891 were less than in 1890 by over 400, their average size had increased so as to closely crowd the 1200-ton mark, while for all the other United States ports combined the average size was under 800 tons. In this respect, therefore, as well as in the volume of business, New York is not merely equal to all the other seaports of the country, but far ahead of them in their united operations.

Although maritime people are naturally conservative, yet American enterprise has recently inaugurated important innovations in the carrying trade. Perhaps the chief among them is the tank steamer. Why it was not sooner invented is now the wonder. In loading fluid cargoes—molasses, for instance, at the West Indies—the custom was to stow the empty casks in the vessel's hold and to fill the tiers successively by means of hose. It was reserved for this year to dispense with the cask and to turn the hose into the hold itself, and on arrival to pump out the treacular sweetness. Not only is petroleum so carried, but the "oil tank" is used, after being chemically cleansed, for carrying the juice of the cane. The ocean barge is another innovation. Antiquated ships are "razeed," loaded with coal or other coarse cargo and towed to their destination by powerful ocean tugs. Steam has also made advances. Passenger steamers, after reaching their destination, run in the night to neighboring ports, and having taken in a full cargo, steam back again and sail on schedule time.

Opinions differ respecting the prospects of shipbuilding for 1892, some anticipating remunerative freights, based on the requirements of Europe for our superabundant crops. Pessimists, however, view the outlook with gloom. They consider that there cannot be sufficient business for the large amount of tonnage now afloat, including that which Great Britain launched two years ago under the stimulus of high freights and scarcity of ships.

The *Railroad Gazette* says of the output of locomotives for the year 1891: "From the returns of locomotive building by the private shops—that is, all other than railroad shops—that we have received up to this date the output is less than it was last year. We can compare the product of but 13 works in the two years, but these include all of the large works. These show 2153 locomotives built in 1891, against 2240 in 1890, a falling off of a little less than 4 per cent. This is better than we had anticipated from the current reports, which have generally been that the shops were slack. The fact seems to be that within the last two or three years the capacity of the private shops has increased so greatly that what is now but a very moderate business for them would have kept them running nights a short time ago. All but three of the shops from which we have comparative figures fell off this year, and there were special reasons why those three should have increased their output. The total output of 13 works this year (two of which did not report last year) is 2300."

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CURRENT HARDWARE PRICES.

JANUARY 6, 1892.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Adjusters, Blind.

Domestic.....\$ dos \$3.00, \$3.50
"celestial".....\$ dos \$10.00.....50¢10¢25
North's.....list net 40¢
Zimmerman's—See Fasteners Blind.

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils.

Eagle Anvil, 100 lbs.....15¢15¢55
Peter Wright's.....11¢11¢45
Armstrong's Mouse Hole.....10¢11¢
Armstrong's Mouse Hole, Extra.....12¢12¢45
Trenton.....10¢10¢45
Wilkinson's.....10¢10¢45
Moore & Barnes Mfg. Co.....33¢45

Anvil Vise and Drill.

Millers Falls Co., \$18.00.....30¢
Chester Anvil and Vise.....35¢
Allen Anvil and Vise, \$3.00.....45¢15¢
Star.....45¢15¢

Apple Parers—See Parers, Apple.

Augers and Bits.

Douglas Mfg. Co.....40¢10¢70
Wm. A. Ives & Co.....40¢10¢70
Humphreysville Mfg. Co.....40¢10¢70
French, Swift & Co. (F. H. Beecher, P. B. & W. Co.).....40¢10¢70
Rockford Bit Company.....40¢10¢70
Cook's, Douglas Mfg. Co.....45¢
Cook's, N. H. Copper Co.....45¢10¢10¢55
Ives' Circular Lip.....60¢
Patent Solid Head.....30¢
C. E. Jennings & Co., No. 10, extension lip.....40¢
C. E. Jennings & Co., No. 30.....60¢
C. E. Jennings & Co., Auger Bits, 1/2 set.....83¢
Lewis' Patent Single Twist.....45¢
Russell Jennings' Augers and Bits.....25¢10¢
Imitation Jennings' Bits.....40¢10¢10¢
Fugh's Black.....20¢
Car Bits.....60¢10¢10¢
Car Bits, P. B. & W. Co.....60¢10¢10¢
Snell's Car Bits.....60¢10¢10¢
L. Hommedieu Car Bits.....15¢10¢
Forstner Pat. Auger Bits.....20¢
Cincinnati Roll-Hangers' Bits.....30¢10¢

Bit Stock Drills.

Morse Twist Drills.....50¢10¢55
Standard.....50¢10¢55
Cleveland.....50¢10¢55
Syracuse, for metal.....60¢10¢
Syracuse, for wood (wood list).....30¢10¢55
Cincinnati, for wood.....30¢10¢
Cincinnati, for metal.....45¢10¢

Expansive Bits.

Clark's small, 1 1/2; large, 3/8, 3/4, 3/5, 3/4, 1/2, 1/4, 1/8, 1/16, 1/32, 1/64, 1/128, 1/256, 1/512, 1/1024, 1/2048, 1/4096, 1/8192, 1/16384, 1/32768, 1/65536, 1/131072, 1/262144, 1/524288, 1/1048576, 1/2097152, 1/4194304, 1/8388608, 1/16777216, 1/33554432, 1/67108864, 1/134217728, 1/268435456, 1/536870912, 1/1073741824, 1/2147483648, 1/4294967296, 1/8589934592, 1/17179869184, 1/34359738368, 1/68719476736, 1/137438953472, 1/274877906944, 1/549755813888, 1/1099511627776, 1/2199023255552, 1/4398046511104, 1/8796093022208, 1/17592186044416, 1/35184372088832, 1/70368744177664, 1/140737488355328, 1/281474976710656, 1/562949953421312, 1/1125899906842624, 1/2251799813685248, 1/4503599627370496, 1/9007199254740992, 1/18014398509481984, 1/36028797018963968, 1/72057594037927936, 1/144115188075855872, 1/288230376151711744, 1/576460752303423488, 1/1152921504606846976, 1/2305843009213693952, 1/4611686018427387904, 1/9223372036854775808, 1/18446744073709551616, 1/36893488147419103232, 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Hangers—	
Barn Door, old patterns.....	60¢10¢10¢70¢
Barn Door, New England.....	60¢10¢10¢70¢
Samson Steel Anti-Friction.....	55¢
Hamilton Wrought Wood Track.....	55¢
U. S. Wood Track.....	60¢10¢
Champion.....	60¢10¢
Rider and Wooster, Medina Mfg. Co.'s Hst.....	70¢
Climax Anti-Friction.....	55¢
Climax Anti-Friction for Wood Track.....	55¢
Health for Wood Track.....	55¢
Beed's Steel Arm.....	50¢
Challenge, Barn Door.....	50¢
Sterling.....	50¢10¢10¢
Victor, No. 1, \$15.00; No. 2, \$16.50; No. 3, \$18.00.....	60¢25¢
Chlorine.....	50¢10¢
Kladder.....	60¢10¢60¢
Boss.....	60¢10¢
Best Anti-Friction.....	60¢10¢
Duplex (Wood Track).....	60¢10¢25¢
Terry's Pat., 7 dos pr. 4 in, \$10.00; 5 in, \$12.00.....	50¢10¢
Terry's Steel Anti-Friction Leader.....	50¢10¢
Terry's Steel Anti-Friction Ideal.....	50¢10¢
Cronk's Patent, Steel Covered.....	50¢5¢
Wood Track Iron Clad, 7 ft. 10.....	50¢
Carrier Steel Anti-Friction.....	45¢60¢
Architect, 7 set \$6.00.....	20¢
Belipse.....	30¢10¢
Felix, 7 set \$4.50.....	20¢
Richards.....	20¢
Lane's Standard.....	50¢5¢50¢10¢
Lane's New Standard.....	50¢50¢55¢
Lane's Parlor.....	40¢
Ball Bearing Door Hanger.....	20¢10¢25¢10¢
Warner's Pat.....	20¢10¢20¢10¢10¢
Stearns' Anti-Friction.....	20¢10¢20¢10¢10¢
Stearns' Challenge.....	25¢10¢50¢10¢10¢
Faultless.....	40¢40¢55¢
American, 7 set \$6.00.....	20¢10¢
Rider & Wooster, No. 1, 62¢; No. 2, 70¢.....	40¢
Paragon, Nos. 1, 2 and 3.....	40¢10¢
Cincinnati.....	25¢10¢
Paragon, Nos. 4, 5 and 6.....	20¢10¢
Prescent.....	60¢50¢10¢
Nickel Cast Iron.....	50¢
Nickel, Malleable Iron and Steel.....	40¢
Scranton Anti-Friction Single Strap.....	40¢
Wild West, 4 in. Wheel, \$15.00; 5 in. Wheel, \$21.00.....	45¢
Star.....	50¢50¢50¢10¢
May.....	50¢50¢50¢10¢
Barry, \$6.00.....	40¢10¢
Interstate.....	50¢
Magie.....	45¢
Pendulum, Payson's.....	45¢
Harness Snaps—See Snaps.	
Hatchets—	
American Axe and Tool Co.	
Blood's.....	
Hunt's.....	
Hurd's.....	
Mann's.....	
Peck's.....	
Underhill's.....	40¢ & 10¢
Buffalo Hammer Co.....	50¢55¢
Fayette R. Plumb.....	
C. Hammond & Son.....	
Kelly's.....	
Sargent & Co.....	
P. S. & W. Co.....	
Ten Eyck Edge Tool Co.....	
Collins.....	10¢
Schulte, Lohoff & Co.....	50¢50¢55¢
Hay and Straw Knives—See Knives.	
Hinges—	
Blind Hinges—	
Farker.....	75¢25¢
Huffer.....	60¢
Clark's, Nos. 1, 3, 5, 40 and 50.....	75¢10¢50¢80¢
Clark's Morise Gravity.....	60¢
Sargent's Nos. 1, 3, 5, 11, 13.....	75¢10¢55¢10¢25¢
Sargent's, No. 12.....	77¢10¢10¢
Reading's Gravity.....	75¢10¢75¢10¢55¢
Shepard's.....	
Noiseless.....	75¢10¢
Nagara.....	80¢
Buffalo.....	80¢
Clark's Genuine Pattern.....	80¢
O. S. Lull & Porter.....	75¢10¢
Acme, Lull & Porter.....	75¢
Queen City Reversible.....	70¢10¢50¢75¢
Clark's Lull & Porter, Nos. 0, 1, 14, 2, 24, 3.....	75¢10¢25¢
North's Automatic Blind Hinges, No. 2, for Wood, \$9.00; No. 3, for Brick, \$11.50.....	10¢
Gate Hinges—	
Western.....	7 dos \$4.40, 60¢
S. E.....	7 dos \$7.00, 55¢
W. E. Reversible.....	7 dos \$5.20, 55¢10¢
Clark's, Nos. 1, 2, 3.....	60¢10¢25¢
W. Y. State.....	7 dos \$12.50, 50¢
Automatic.....	7 dos \$12.50, 50¢
Shepard's.....	60¢10¢25¢
Spring Hinges—	
Geer's Spring and Blank Butts.....	40¢
Union Spring Hinge Co.'s list, March 1886.....	25¢
Barker's Double Action.....	25¢
Union Mfg. Co.....	25¢
Bommer's.....	30¢
Buckman's.....	15¢20¢
Chicago.....	30¢
Bardley's Patent.....	40¢
Acme.....	30¢
U. S.....	35¢
Empire and Crown.....	35¢
Hero and Monarch.....	55¢
American, Gem, and Star.....	20¢
Oxford.....	20¢
Wiley.....	10¢
Devore's.....	40¢
Rex.....	40¢
Royal.....	60¢
Reliable.....	60¢
Champion.....	60¢
Stearns.....	60¢10¢
Samton.....	7 gross, \$14.00
Wrought Iron Hinges.	
List February 14, 1891.	
Strap and T.....	50¢50¢10¢

Corrugated Strap & T.....	50¢50¢10¢
Screw Hook and.....	6 to 12 in., 7¢; 14 to 20 in., 9¢; 22 to 36 in., 11¢
Strap.....	14 in., 7¢; 16 in., 8¢; 18 in., 9¢; 20 in., 10¢; 22 in., 11¢; 24 in., 12¢; 26 in., 13¢; 28 in., 14¢; 30 in., 15¢; 32 in., 16¢; 34 in., 17¢; 36 in., 18¢; 38 in., 19¢; 40 in., 20¢; 42 in., 21¢; 44 in., 22¢; 46 in., 23¢; 48 in., 24¢; 50 in., 25¢; 52 in., 26¢; 54 in., 27¢; 56 in., 28¢; 58 in., 29¢; 60 in., 30¢
Screw Hook and Eye.....	14 in., 7¢; 16 in., 8¢; 18 in., 9¢; 20 in., 10¢; 22 in., 11¢; 24 in., 12¢; 26 in., 13¢; 28 in., 14¢; 30 in., 15¢; 32 in., 16¢; 34 in., 17¢; 36 in., 18¢; 38 in., 19¢; 40 in., 20¢; 42 in., 21¢; 44 in., 22¢; 46 in., 23¢; 48 in., 24¢; 50 in., 25¢; 52 in., 26¢; 54 in., 27¢; 56 in., 28¢; 58 in., 29¢; 60 in., 30¢
Rolled Blind Hinges, Nos. 32 and 34.....	50¢10¢
Rolled Blind Hinges, Nos. 32 and 34.....	50¢10¢
Rolled Plate.....	70¢10¢
Rolled Raised.....	70¢10¢
Plate Hinges (8, 10 & 12 in., 7¢; 14 in., 8¢; 16 in., 9¢; 18 in., 10¢; 20 in., 11¢; 22 in., 12¢; 24 in., 13¢; 26 in., 14¢; 28 in., 15¢; 30 in., 16¢; 32 in., 17¢; 34 in., 18¢; 36 in., 19¢; 38 in., 20¢; 40 in., 21¢; 42 in., 22¢; 44 in., 23¢; 46 in., 24¢; 48 in., 25¢; 50 in., 26¢; 52 in., 27¢; 54 in., 28¢; 56 in., 29¢; 58 in., 30¢; 60 in., 31¢; 62 in., 32¢; 64 in., 33¢; 66 in., 34¢; 68 in., 35¢; 70 in., 36¢; 72 in., 37¢; 74 in., 38¢; 76 in., 39¢; 78 in., 40¢; 80 in., 41¢; 82 in., 42¢; 84 in., 43¢; 86 in., 44¢; 88 in., 45¢; 90 in., 46¢; 92 in., 47¢; 94 in., 48¢; 96 in., 49¢; 98 in., 50¢; 100 in., 51¢; 102 in., 52¢; 104 in., 53¢; 106 in., 54¢; 108 in., 55¢; 110 in., 56¢; 112 in., 57¢; 114 in., 58¢; 116 in., 59¢; 118 in., 60¢; 120 in., 61¢; 122 in., 62¢; 124 in., 63¢; 126 in., 64¢; 128 in., 65¢; 130 in., 66¢; 132 in., 67¢; 134 in., 68¢; 136 in., 69¢; 138 in., 70¢; 140 in., 71¢; 142 in., 72¢; 144 in., 73¢; 146 in., 74¢; 148 in., 75¢; 150 in., 76¢; 152 in., 77¢; 154 in., 78¢; 156 in., 79¢; 158 in., 80¢; 160 in., 81¢; 162 in., 82¢; 164 in., 83¢; 166 in., 84¢; 168 in., 85¢; 170 in., 86¢; 172 in., 87¢; 174 in., 88¢; 176 in., 89¢; 178 in., 90¢; 180 in., 91¢; 182 in., 92¢; 184 in., 93¢; 186 in., 94¢; 188 in., 95¢; 190 in., 96¢; 192 in., 97¢; 194 in., 98¢; 196 in., 99¢; 198 in., 100¢; 200 in., 101¢; 202 in., 102¢; 204 in., 103¢; 206 in., 104¢; 208 in., 105¢; 210 in., 106¢; 212 in., 107¢; 214 in., 108¢; 216 in., 109¢; 218 in., 110¢; 220 in., 111¢; 222 in., 112¢; 224 in., 113¢; 226 in., 114¢; 228 in., 115¢; 230 in., 116¢; 232 in., 117¢; 234 in., 118¢; 236 in., 119¢; 238 in., 120¢; 240 in., 121¢; 242 in., 122¢; 244 in., 123¢; 246 in., 124¢; 248 in., 125¢; 250 in., 126¢; 252 in., 127¢; 254 in., 128¢; 256 in., 129¢; 258 in., 130¢; 260 in., 131¢; 262 in., 132¢; 264 in., 133¢; 266 in., 134¢; 268 in., 135¢; 270 in., 136¢; 272 in., 137¢; 274 in., 138¢; 276 in., 139¢; 278 in., 140¢; 280 in., 141¢; 282 in., 142¢; 284 in., 143¢; 286 in., 144¢; 288 in., 145¢; 290 in., 146¢; 292 in., 147¢; 294 in., 148¢; 296 in., 149¢; 298 in., 150¢; 300 in., 151¢; 302 in., 152¢; 304 in., 153¢; 306 in., 154¢; 308 in., 155¢; 310 in., 156¢; 312 in., 157¢; 314 in., 158¢; 316 in., 159¢; 318 in., 160¢; 320 in., 161¢; 322 in., 162¢; 324 in., 163¢; 326 in., 164¢; 328 in., 165¢; 330 in., 166¢; 332 in., 167¢; 334 in., 168¢; 336 in., 169¢; 338 in., 170¢; 340 in., 171¢; 342 in., 172¢; 344 in., 173¢; 346 in., 174¢; 348 in., 175¢; 350 in., 176¢; 352 in., 177¢; 354 in., 178¢; 356 in., 179¢; 358 in., 180¢; 360 in., 181¢; 362 in., 182¢; 364 in., 183¢; 366 in., 184¢; 368 in., 185¢; 370 in., 186¢; 372 in., 187¢; 374 in., 188¢; 376 in., 189¢; 378 in., 190¢; 380 in., 191¢; 382 in., 192¢; 384 in., 193¢; 386 in., 194¢; 388 in., 195¢; 390 in., 196¢; 392 in., 197¢; 394 in., 198¢; 396 in., 199¢; 398 in., 200¢; 400 in., 201¢; 402 in., 202¢; 404 in., 203¢; 406 in., 204¢; 408 in., 205¢; 410 in., 206¢; 412 in., 207¢; 414 in., 208¢; 416 in., 209¢; 418 in., 210¢; 420 in., 211¢; 422 in., 212¢; 424 in., 213¢; 426 in., 214¢; 428 in., 215¢; 430 in., 216¢; 432 in., 217¢; 434 in., 218¢; 436 in., 219¢; 438 in., 220¢; 440 in., 221¢; 442 in., 222¢; 444 in., 223¢; 446 in., 224¢; 448 in., 225¢; 450 in., 226¢; 452 in., 227¢; 454 in., 228¢; 456 in., 229¢; 458 in., 230¢; 460 in., 231¢; 462 in., 232¢; 464 in., 233¢; 466 in., 234¢; 468 in., 235¢; 470 in., 236¢; 472 in., 237¢; 474 in., 238¢; 476 in., 239¢; 478 in., 240¢; 480 in., 241¢; 482 in., 242¢; 484 in., 243¢; 486 in., 244¢; 488 in., 245¢; 490 in., 246¢; 492 in., 247¢; 494 in., 248¢; 496 in., 249¢; 498 in., 250¢; 500 in., 251¢; 502 in., 252¢; 504 in., 253¢; 506 in., 254¢; 508 in., 255¢; 510 in., 256¢; 512 in., 257¢; 514 in., 258¢; 516 in., 259¢; 518 in., 260¢; 520 in., 261¢; 522 in., 262¢; 524 in., 263¢; 526 in., 264¢; 528 in., 265¢; 530 in., 266¢; 532 in., 267¢; 534 in., 268¢; 536 in., 269¢; 538 in., 270¢; 540 in., 271¢; 542 in., 272¢; 544 in., 273¢; 546 in., 274¢; 548 in., 275¢; 550 in., 276¢; 552 in., 277¢; 554 in., 278¢; 556 in., 279¢; 558 in., 280¢; 560 in., 281¢; 562 in., 282¢; 564 in., 283¢; 566 in., 284¢; 568 in., 285¢; 570 in., 286¢; 572 in., 287¢; 574 in., 288¢; 576 in., 289¢; 578 in., 290¢; 580 in., 291¢; 582 in., 292¢; 584 in., 293¢; 586 in., 294¢; 588 in., 295¢; 590 in., 296¢; 592 in., 297¢; 594 in., 298¢; 596 in., 299¢; 598 in., 300¢; 600 in., 301¢; 602 in., 302¢; 604 in., 303¢; 606 in., 304¢; 608 in., 305¢; 610 in., 306¢; 612 in., 307¢; 614 in., 308¢; 616 in., 309¢; 618 in., 310¢; 620 in., 311¢; 622 in., 312¢; 624 in., 313¢; 626 in., 314¢; 628 in., 315¢; 630 in., 316¢; 632 in., 317¢; 634 in., 318¢; 636 in., 319¢; 638 in., 320¢; 640 in., 321¢; 642 in., 322¢; 644 in., 323¢; 646 in., 324¢; 648 in., 325¢; 650 in., 326¢; 652 in., 327¢; 654 in., 328¢; 656 in., 329¢; 658 in., 330¢; 660 in., 331¢; 662 in., 332¢; 664 in., 333¢; 666 in., 334¢; 668 in., 335¢; 670 in., 336¢; 672 in., 337¢; 674 in., 338¢; 676 in., 339¢; 678 in., 340¢; 680 in., 341¢; 682 in., 342¢; 684 in., 343¢; 686 in., 344¢; 688 in., 345¢; 690 in., 346¢; 692 in., 347¢; 694 in., 348¢; 696 in., 349¢; 698 in., 350¢; 700 in., 351¢; 702 in., 352¢; 704 in., 353¢; 706 in., 354¢; 708 in., 355¢; 710 in., 356¢; 712 in., 357¢; 714 in., 358¢; 716 in., 359¢; 718 in., 360¢; 720 in., 361¢; 722 in., 362¢; 724 in., 363¢; 726 in., 364¢; 728 in., 365¢; 730 in., 366¢; 732 in., 367¢; 734 in., 368¢; 736 in., 369¢; 738 in., 370¢; 740 in., 371¢; 742 in., 372¢; 744 in., 373¢; 746 in., 374¢; 748 in., 375¢; 750 in., 376¢; 752 in., 377¢; 754 in., 378¢; 756 in., 379¢; 758 in., 380¢; 760 in., 381¢; 762 in., 382¢; 764 in., 383¢; 766 in., 384¢; 768 in., 385¢; 770 in., 386¢; 772 in., 387¢; 774 in., 388¢; 776 in., 389¢; 778 in., 390¢; 780 in., 391¢; 782 in., 392¢; 784 in., 393¢; 786 in., 394¢; 788 in., 395¢; 790 in., 396¢; 792 in., 397¢; 794 in., 398¢; 796 in., 399¢; 798 in., 400¢; 800 in., 401¢; 802 in., 402¢; 804 in., 403¢; 806 in., 404¢; 808 in., 405¢; 810 in., 406¢; 812 in., 407¢; 814 in., 408¢; 816 in., 409¢; 818 in., 410¢; 820 in., 411¢; 822 in., 412¢; 824 in., 413¢; 826 in., 414¢; 828 in., 415¢; 830 in., 416¢; 832 in., 417¢; 834 in., 418¢; 836 in., 419¢; 838 in., 420¢; 840 in., 421¢; 842 in., 422¢; 844 in., 423¢; 846 in., 424¢; 848 in., 425¢; 850 in., 426¢; 852 in., 427¢; 854 in., 428¢; 856 in., 429¢; 858 in., 430¢; 860 in., 431¢; 862 in., 432¢; 864 in., 433¢; 866 in., 434¢; 868 in., 435¢; 870 in., 436¢; 872 in., 437¢; 874 in., 438¢; 876 in., 439¢; 878 in., 440¢; 880 in., 441¢; 882 in., 442¢; 884 in., 443¢; 886 in., 444¢; 888 in., 445¢; 890 in., 446¢; 892 in., 447¢; 894 in., 448¢; 896 in., 449¢; 898 in., 450¢; 900 in., 451¢; 902 in., 452¢; 904 in., 453¢; 906 in., 454¢; 908 in., 455¢; 910 in., 456¢; 912 in., 457¢; 914 in., 458¢; 916 in., 459¢; 918 in., 460¢; 920 in., 461¢; 922 in., 462¢; 924 in., 463¢; 926 in., 464¢; 928 in., 465¢; 930 in., 466¢; 932 in., 467¢; 934 in., 468¢; 936 in., 469¢; 938 in., 470¢; 940 in., 471¢; 942 in., 472¢; 944 in., 473¢; 946 in., 474¢; 948 in., 475¢; 950 in., 476¢; 952 in., 477¢; 954 in., 478¢; 956 in., 479¢; 958 in., 480¢; 960 in., 481¢; 962 in., 482¢; 964 in., 483¢; 966 in., 484¢; 968 in., 485¢; 970 in., 486¢; 972 in., 487¢; 974 in., 488¢; 976 in., 489¢; 978 in., 490¢; 980 in., 491¢; 982 in., 492¢; 984 in., 493¢; 986 in., 494¢; 988 in., 495¢; 990 in., 496¢; 992 in., 497¢; 994 in., 498¢; 996 in., 499¢; 998 in., 500¢; 1000 in., 501¢; 1002 in., 502¢; 1004 in., 503¢; 1006 in.,	

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Peace Cross Cuts.....	45¢	45¢
Richardson's Circular and Mill	40¢	45¢
Richardson's X Cuts.....	45¢	45¢
Richardson's Hand, &c.....	25¢	25¢
C. E. Jennings & Co., Hand, Panel and Rip	25¢	25¢

Back Saws—

Griffin's, complete.....40¢10¢50¢
 Griffin's Back Saw, Blades.....40¢10¢50¢
 Star Back Saws and Blades.....25¢
 Eureka and Crescent.....25¢

Scroll—

Lester, complete, \$10.00.....25¢
 Rogers, complete, \$4.00.....25¢
 Barnes' Builders' and Cab. Makers' \$15.25¢
 Barnes' Scroll Saw Blades.....35¢

Saw Frames—See Frames, Saw.

Saw Sets—See Sets, Saw.

Saw Tools—See Tools, Saw.

Scales—

Hatch, Counter, No. 171, good quality, \$21.00.....
 Hatch, Tea, No. 161.....\$21.00
 Union Platform, Plain.....\$21.00
 Union Platform, Striped.....\$21.00
 Chastillon's Grocers' Trip Scales.....50¢
 Chastillon's Eureka.....25¢
 Chastillon's Favorite.....25¢
 Family Turnbills.....30¢
 Michie Bros.' Platform.....40¢

Scale Beams—See Beams, Scale

Scissors, Fluting.....45¢

Scrapers—

Adjustable Box Scraper (S. R. & L. Co.).....
 \$6.50.....\$3.00
 Box, 1 Handle.....\$4.00
 Box, 2 Handle.....\$4.00
 Deference Box and Ship.....\$4.00
 Foot.....\$4.00
 Ship, Common.....\$4.00
 Ship, R. I. Tool Co.....\$4.00

Screen Window and Door Frames—See Frames.

Screw Drivers—See Drivers, Screw.

Screws.**Beach and Hand—**

Bench, Iron.....55¢10¢10¢
 Bench, Wood, Beech.....\$2.25
 Bench, Wood, Hickory.....20¢10¢
 Hand, Wood.....25¢10¢10¢
 Hand, Grand Rapids, list.....75¢
 Lag, Blunt Point, list Jan. 1, 1890, 75¢10¢
 Coach and Lag, Gimlet Point, list Jan. 1, 1890.....75¢10¢
 Bed.....25¢5¢
 Hand Rail, Sargent's.....60¢10¢
 Hand Rail, H. & P. Mfg. Co.....70¢10¢
 Hand Rail, Am. Screw Co.....75¢
 Jack Screws, Millers' Falls.....50¢
 Jack Screws, P. S. & W.....35¢
 Jack Screws, Sargent's.....60¢10¢
 Jack Screws, Stearns.....60¢10¢
 Cork.....

Humason & Beckley Mfg. Co. 40¢10¢50¢
 Williamson's.....35¢10¢50¢
 Howe Bros. & Hulbert.....35¢

Machine—

Flat Head, Iron.....55¢
 Round Head, Iron.....50¢

Wood—

List January 1, 1891.....

Flat Head Iron.....70¢
 Round Head Iron.....65¢
 Flat Head Brass.....70¢
 Round Head Brass.....65¢
 Flat Head Bronze.....70¢
 Round Head Bronze.....65¢
 Rogers' Drive Screws.....35¢

Scroll Saws—See Saws, Scroll.

Scythes.

Grain.....40¢25¢40¢10¢
 Grass.....40¢10¢50¢

Scythe Snaths—See Snaths, Scythe

Snaths.

And Tool.....

Alken's Sets, Awns and Tools.....

No. 20, \$10.00.....55¢10¢
 Pray's Adj. Tool Hds., Nos. 1, 112, 2, 118;
 3, 115, 4, 119.....25¢5¢10¢
 Miller's Pat. A. Tool Hds.....25¢
 No. 1, 112, 2, 118.....25¢
 Henry's Combination Hdt.....\$4.50
 Stanley's Excelsior.....30¢10¢
 No. 1, \$7.50; No. 2, \$4.00; No. 3,
 \$6.00.....30¢10¢
 Common "rad Sets.....30¢10¢
 No. 43, \$12.50; No. 45, \$12.50.....70¢10¢5¢

Nail—

Square.....\$ gr. \$4.00 \$4.25
 Round.....\$ gr. \$3.25
 Buck Froe.....27¢
 Cannon's Diamond Point.....\$ gr. \$1.25, 20¢

Rivet.

Regular list.....50¢10¢

Saw—

Stillman's Genuine.....\$ dos \$5.00 @ 7.75,
 40¢25¢
 Stillman's Pattern Hand, \$ dos \$3.25;
 Cross Cut, 5.20.....45¢50¢
 C-minut never.....\$ dos \$2.00, 45¢50¢
 Merrill's No. 1, \$18.00; Nos. 2, 24, 28, 30,
 32, 34, 36, 38, 40, 42, 44, 46, 48, 50,
 52, 54, 56, 58, 60, 62, 64, 66, 68, 70,
 72, 74, 76, 78, 80, 82, 84, 86, 88, 90,
 92, 94, 96, 98, 100.....40¢10¢50¢

Leach's, No. 0, \$3.00; No. 1, \$1.15, 15¢20¢
 Nash's.....80¢10¢50¢10¢10¢
 Hammer, Hotchkiss.....\$5.50, 10¢
 Hammer, Bemis & Call Co.'s new Pat.
 30¢25¢

Bemis & Call Co.'s Lever and Spring
 Hammer.....30¢25¢
 Bemis & Call Co.'s Plate.....10¢
 Bemis & Call Co.'s Cross Cut.....12¢4¢
 Alken's Genuine.....\$13.00, 50¢10¢60¢
 Alken's Imitation.....\$7.00, 65¢25¢
 Hart's Pat. Lever.....20¢
 Diston's Bar.....40¢10¢50¢
 Leopold.....\$ dos No. 1, \$6.00
 Atkin's Lever.....\$ dos No. 1, \$6.00
 Croissant (Keller), No. 1, \$15.00; No. 2,
 \$24.00.....40¢10¢
 Avery's Saw Set and Punch.....60¢
 Chertoff Co.'s Superior.....\$ dos \$7.00
 Chertoff Co.'s Royal.....\$ dos \$7.50
 Crescent.....\$ dos \$8.00

Sharpeners, Knife.

Parkins.....

Applewood Handles.....\$ dos \$6.00, 40¢
 Rosewood or Cocobola.....\$ dos \$6.00, 40¢

Shaves, Spoke

Iron.....45¢
 Wood.....30¢
 Bailey's (Stanley R. & L. Co.).....40¢10¢
 Cincinnati.....35¢10¢
 Goodell's, \$ dos \$9.00.....25¢

Shears—

American (Cast) Iron.....75¢10¢75¢10¢5¢
 Barnard's Lamp Trimmers.....\$ dos \$3.75
 Tinner's.....30¢25¢
 Seymour's, list, Dec. 1881.....

Heinrich's, list, Dec. 1881.....

Heinrich's Tailor's Shears.....33¢4¢
 Cast Steel Trimmers.....80¢10¢10¢
 Second quality.....50¢10¢80¢10¢10¢
 Acme Cast Shears.....10¢10¢
 Diamond Cast Shears.....10¢
 Clipper.....10¢10¢
 Victor Cast Shears.....75¢10¢75¢10¢5¢
 Howe Bros. & Hulbert, Solid Forged
 Steel.....40¢
 Chicago Drop Forge & P. Co., Solid
 Steel Forged.....60¢
 Davenport Cutlery Co.....60¢10¢10¢
 Clausen Shear Co., Japaned.....70¢
 Clausen Shear Co., Nickel, same list.....60¢
 Galvanic, 3½ to 9 in., \$ dos, \$1.00 \$ inch

Pruning Shears and Hooks.

Diston's Combined Pruning Hook and
 Saw.....\$ dos \$15.00, 20¢10¢
 Diston's Pruning Hook, \$ dos \$12.00.....

E. S. Lee & Co.'s Pruning Tools.....40¢
 Pruning Shears, Henry's Pat., \$ dos
 \$3.75 \$4.00.....4.50
 Henry's Pruning Shears, \$ dos \$4.25.....

Wheeler, M. & C. Co.'s Combination,
 \$ dos \$12.00, 20¢
 Dunlap's Saw and Chisel, \$ dos \$5.50, 30¢
 J. Mallinson & Co., No. 1, \$5.25; No. 2, 7.25
 P. S. & W. Co.....60¢

Tinner's, etc.—

Shears and Snips (P. S. & W.).....30¢25¢
 Snips, J. Mallinson & Co.....25¢4¢

Shenvers—

Sliding Door—

M. W. Co., list July, 1888.....50¢10¢60¢5¢
 R. & E., list Dec. 18, 1888.....55¢20¢
 Corbin's list.....60¢10¢25¢
 Patent Roller.....60¢10¢25¢
 Patent Roller, Hatfield's.....75¢
 Russell's Anti-Friction, list Dec. 18,
 1885.....60¢25¢
 Moore's Anti-Friction.....50¢

Sliding Shutter—

R. & E., list Dec. 18, 1885.....60¢10¢25¢
 Sargent's list.....60¢10¢
 Reading list.....60¢10¢10¢

Shells—

First quality, 4, 8, 10 and 12 gauge
 25¢10¢25¢
 First quality, 14, 16 and 20 gauge (10
 list).....30¢10¢25¢
 Rise.....40¢25¢
 Star, Club, Rival and Climax.....35¢10¢25¢
 verbold's Com. Shot Shells.....15¢25¢
 Brass Shot Shells, 1st quality.....60¢25¢
 Brass Shot Shells, Club, Rival, Climax.....60¢25¢

Shells Loaded—

standard list, July 19, 1890.....40¢10¢10¢40¢10¢25¢

Ship Tools—

L. & J. J. White.....30¢25¢

Shoes, Horse, Mule, &c.—

Burden's, Perkins', Phoenix and Bry-
 den's Boss, at factory.....\$4.00
 Bryden's Frog Pressure, at factory.....\$5.00

Mule—

Add \$1 keg to above prices.

Or, Wrought—

Ton lots.....\$ 9 99
 1000 lb lots.....\$ 9 99
 500 lb lots.....\$ 9 99

Shot—

Drop, up to B, 25-b bag.....\$1.47
 Drop, up to R, 5-b bag......35
 Drop, B and larger, 25-b
 bag.....1.67
 Drop, B and larger 5-b
 bag......40
 Buck and Chilled, 25-b
 bag.....1.67
 Buck and Chilled 5-b
 bag......40
 Dust Shot, 25-b bag.....2.00
 Dust Shot, 5-b bag......45

Shovels and Spades—

Ames' Shovels, Spades, &c., list Nov. 1,
 1885.....20¢
 Norz—Jobbers frequently give 5¢75¢
 extra on above.....60¢10¢
 Griffith's C. S.....60¢10¢
 Griffith's Solid C. S. R. R. Goods.....20¢
 St. Louis Shovel Co.....30¢20¢75¢
 Hussey, Binns & Co.....15¢25¢
 Hubbard & Co.....30¢20¢75¢
 Lehigh Mfg. Co.....60¢10¢
 E. M. Myers Co.....30¢
 Payne Pettibone & Son.....30¢25¢
 Kemington's (Lowman's) Pat.....30¢10¢40¢
 Rowland's, Black Iron.....60¢10¢
 Rowland's Steel.....60¢10¢

Shovels and Tongs—

Iron Head.....60¢10¢60¢10¢5¢
 Brass Head.....60¢10¢10¢

Sieves—

Mann's Tin Rim.....60¢25¢
 Buffalo Metallic, S. & Co.....60¢25¢
 Shaker (Barber's Pat.) Flour Sifters.....
 \$ dos \$2.00; \$ gr \$21.00
 A. & W. Sifters.....\$ dos \$2.00
 Hunter's.....\$ dos \$2.00
 Smith's Adjustable Milk Strainer.....
 \$ dos \$2.00
 Smith's Adjustable T. & C. Strainer.....
 \$ dos \$1.25

Stoves, Wooden Rim—

Mesh 18, Nested, \$ dos.....80¢ \$1.00
 Mesh 20, Nested, \$ dos.....95¢ 1.10
 Mesh 24, Nested, \$ dos.....\$1.15 1.25

Skels, Thimble—

Western list.....75¢5¢75¢10¢
 Columbus Wrt. Steel, Special net prices
 Coldbrookdale Iron Co.....60¢
 Seneca Falls Pattern.....60¢
 Utica P. & T. Skels.....60¢
 Utica Tanned and Fitted.....35¢

Snaps—

School, by case.....50¢10¢50¢10¢10¢

Snaps, Harness, &c.—

Anchor (T. & S. Mfg. Co.).....65¢
 Fitch's (Bristol).....50¢10¢
 Hotchkiss.....10¢
 Andrews.....50¢
 Sargent's Patent Guarded.....70¢10¢10¢
 German, new list.....50¢10¢5¢25¢
 Covert, New Pat.....60¢10¢5¢25¢
 Covert, New R. E.....60¢10¢5¢25¢
 Covert's Triumph.....40¢

Snaths, Scythe.

List.....50¢

Soldering Irons—See Irons, Solder-

Ing.

Spittoons, Cuspidors, &c.—

Standard Fiberglass—
 Cuspidors, 8½-inch, No. 5, \$8;
 No. 5X \$9.
 Spittoons, Daisy, 8-inch, No. 1, \$4; 10
 and 11 inch, \$5.

Spoke Shaves—See Shaves, Spoke.

Spoke Trimmers—See Trimmers,

Spoke.

Spoons and Forks—

Tinned Iron—

Basting, Cen. Stamp. Co.'s list.....70¢10¢
 Solid Table and Tea, Cen. Stamp. Co.'s
 list.....70¢10¢
 Buffalo S. S. & Co.....35¢45¢
 Silver-Plated—(4 mos. or 5¢ cash 30
 days)

Meriden Brit. Co., Rogers.....40¢15¢
 C. Rogers & Bros.....40¢15¢
 Rogers & Bro.....40¢15¢
 Reed & Burton.....40¢10¢25¢
 Wm. Rogers Mfg. Co.....40¢15¢
 Simpson, Hall, Miller & Co.....40¢15¢
 Holmes & Edwards Silver Co.....40¢15¢
 L. Boardman & Son.....50¢12¢4¢

Miscellaneous.

Holmes & Edwards Silver Co.:
 No. 67 Mexican Silver.....50¢10¢25¢
 No. 30 Silver Metal.....50¢10¢25¢
 No. 24 German Silver.....50¢10¢25¢
 No. 60 Nickel Silver.....50¢25¢
 No. 49 Nickel Silver.....50¢10¢25¢
 Wm. Rogers Mfg. Co.
 Rogers' Silver Metal.....50¢10¢25¢
 135 Rogers' German Silver.....60¢25¢
 225 Rogers' Nickel Silver.....50¢25¢
 German Silver.....60¢50¢25¢
 German Silver, Hall & Elton.....60¢50¢25¢
 Nickel Silver.....60¢50¢10¢5¢ cash
 Britannia.....60¢50¢25¢
 Boardman's Britannia Silver, July 1,
 1891.....60¢50¢25¢ cash
 Boardman's Britannia Spoons, case
 lots.....60¢25¢ cash

Springs—

Door—

Torrey's Rod, 30 in.....\$ dos \$1.20 @ 1.25
 Gray's, \$ gr. \$20.00.....25¢
 Bee Rod \$ gr. \$20.00.....20¢25¢
 Warner's No. 1, \$ dos, \$2.50; No. 2,
 \$5.50.....50¢60¢50¢
 Goss (Coll), list April 19, 1886.....10¢15¢
 Star (Coll), list April 19, 1886.....30¢25¢25¢
 Victor (Coll).....60¢10¢60¢10¢5¢
 Champion (Coll).....60¢10¢60¢10¢5¢
 Cowell's.....No. 1, \$ dos, \$18.00; No. 2,
 \$15.00.....50¢50¢10¢
 Rubber, complete, \$ dos, \$4.50.....60¢10¢
 Hercules.....50¢50¢10¢

Carriage, Wagon, &c.—

Eliphte, Concord, Platform and Rail
 Scroll.....60¢10¢10¢
 Cliff's Bolster Springs.....25¢

Squares—

Steel and Iron.....\$ dos \$1.00 @ 1.05
 Nickel-Plated.....\$ dos \$1.00 @ 1.05
 Try Square and T Bevels.....\$ dos \$1.00 @ 1.05
 10¢

Diston's Try Square and T Bevels.....50¢
 Winterbottom's Try and Miter.....30¢10¢
 Starrett's Micrometer Caliper Squares.....25¢

Avery's Flush Bevel Squares.....40¢
 Avery's Bevel Protractor.....50¢

Squeezers.

Fodder—

Blair's.....\$ dos \$2.00
 Blair's "Climax".....\$ dos \$1.25

Lemon—

Wood, No. 2.....\$ dos \$5.00, 35¢
 Wood, Common.....\$ dos \$1.70 @ 1.75
 Dunlap's Improved.....\$ dos \$3.75, 20¢
 Sammis.....No. 1, \$5.00; No. 2, \$5.12;
 \$18 \$ dos.....35¢10¢
 Jennings' Star.....\$ dos \$2.50
 The Boss.....\$ dos \$2.50
 Dean's, No. 1, \$ dos \$4.50; \$4.35; \$4,
 \$1.90; Queen, \$2.50

Little Giant.....50¢50¢25¢

King.....40¢25¢

Hotchkiss Straight Flash.....\$ dos \$2.00

Co. Co., Glass.....\$ gro. \$10.00

Mary Lemon Juice Extractor.....

Standard.....\$ dos \$0.75 @ \$1.00

Improved.....\$ dos \$4.00

Standard Fiber Ware—See Ware,

Standard Fiber.

Staples.

Band—

Harbed, ½ in. and larger.....\$ 7 @ 7½¢
 Harbed, ¼ in. and larger.....\$ 7 @ 7½¢

Fence Staples, Galvanized, Same price
 as B'W Wire
 Fence Staples, Plain.....\$ See Trd. Res.

Staplewards.....40¢10¢50¢

Stocks and Dies—

Blacksmith's.....40¢40¢10¢
 Waterford Goods.....40¢40¢10¢
 Butterfield's Goods.....35¢50¢
 Lightning Screw Plate.....35¢50¢
 Reece's New Screw Plates.....35¢45¢40¢
 Reversible Ratchet.....30¢
 Gardner.....35¢

Stops, Bench.

Morrill's.....\$ dos \$9.50, 50¢
 Hotchkiss.....\$ dos \$5.10, 10¢10¢10¢
 Weston's, No. 1, \$10; No. 2, \$9.25; 10¢25¢
 McGill's.....\$ dos \$3.....10¢
 Cincinnati.....25¢10¢
 Terrell's Nos. 1 and 2, \$ dos, \$3; No. 3,
 \$3.00.....30¢

Stone—

Hindustan No. 1, \$; Aze, \$½; Slips
 No. 1, 4½¢
 Sand Stone, Extra.....\$ 3½¢
 Washita Stone, Extra.....\$ 19¢20¢
 Washita Stone, No. 1.....\$ 19¢13¢
 Washita Slips, No. 1, Extra.....\$ 44¢45¢
 Washita Slips, No. 1.....\$ 33¢35¢
 Arkansas Stone, No. 1, 4 to 6 in.....\$1.50
 Arkansas Stone, No. 1, 6 to 9 in.....\$1.85
 Turkey Oil Stone, 4 to 8 in.....\$ 40¢
 Turkey Slips.....\$ \$1.00 @ 1.50
 Lake Superior, Cham.....\$ 18¢
 Lake Superior Slips, Cham.....\$ 30¢
 Seneca Stone, Red Paper Brand.....\$ 18¢30¢

Seneca Stone, High Rounds.....\$ 30¢25¢

Seneca Stone, Small Whets.....\$ gro \$24.00

Stone Polish—See Polish, Stone.

Stretchers, Carpet.

Cast Steel, Polished.....\$ dos \$2.25

Cast Iron, Steel Points.....\$ dos \$1.75

Socket.....\$ dos \$1.75

Ballard's.....35¢40¢10¢

Strops, Razor—

Genuine Emerson.....60¢60¢25¢

Imitation.....\$ dos \$2.00, 3

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